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AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

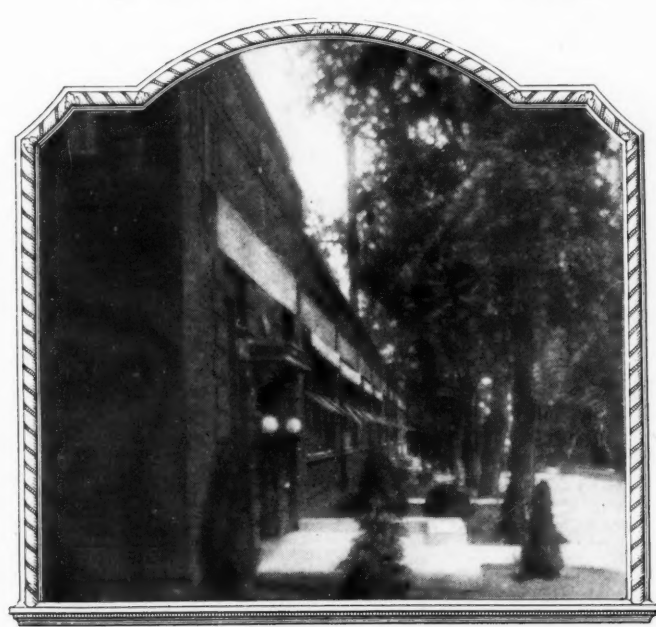
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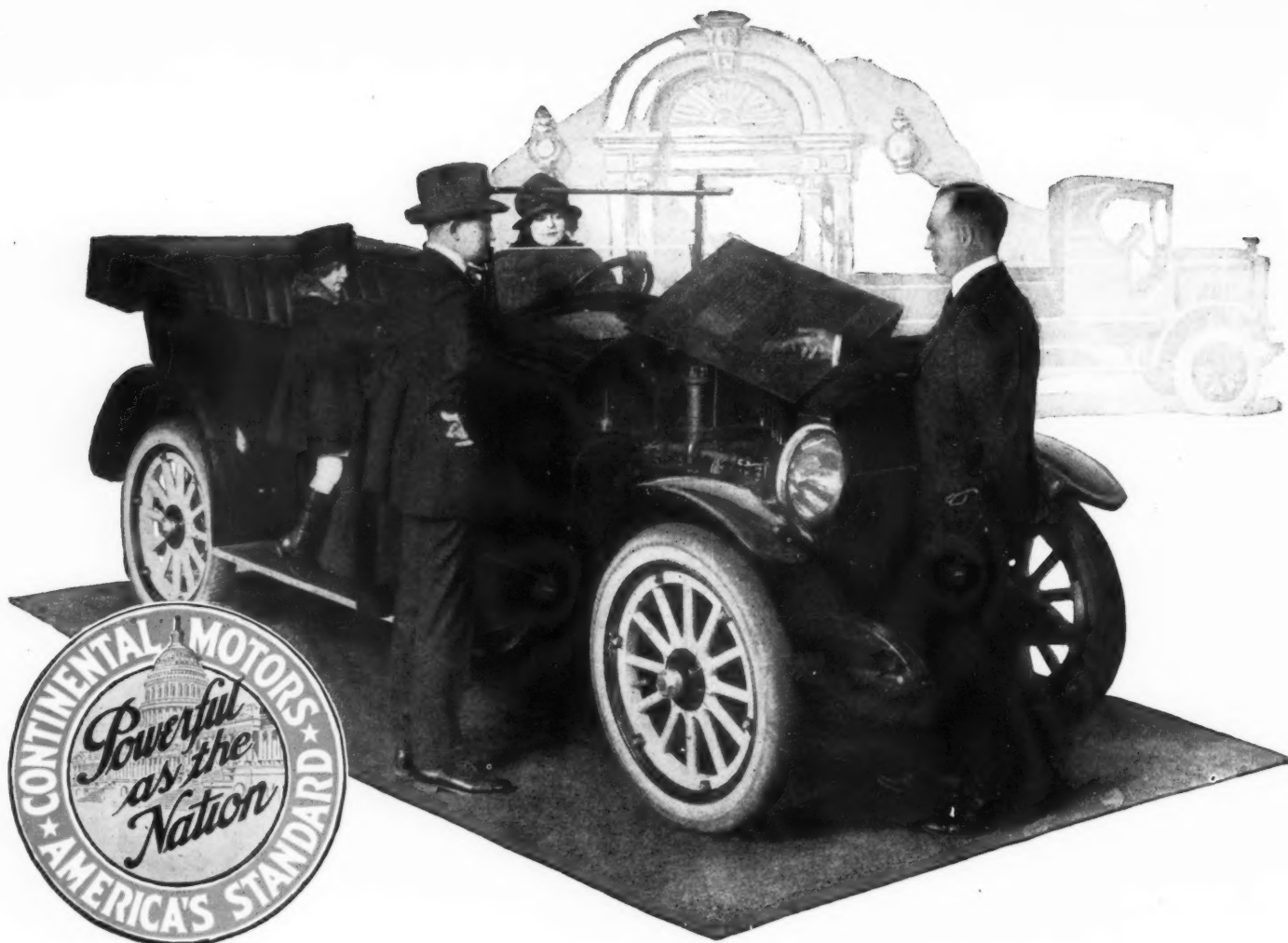


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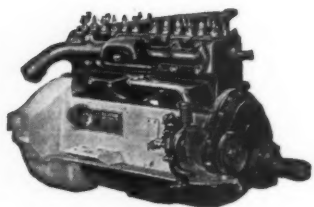
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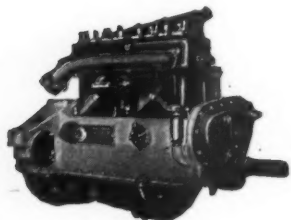
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Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XL

NEW YORK—THURSDAY, MAY 29, 1919—CHICAGO

No. 22

Destruction of the Belgian Industry

By German Military and Civilians

Chiefly for Commercial Advantage

After Army Needs for Machinery and Material Had Been Met,
the Work of Removal and Scrapping Was Continued
with Object of Destroying Export Competition

By W. F. Bradley

BRUSSELS, May 1.—Germany robbed the Belgian Automobile factories of machinery, tools, materials and cars to the value of \$10,000,000. This is a moderate estimate based on pre-war values. If present values were considered this figure would have to be increased by no less than 50 per cent. In arriving at this figure no account has been taken of the prejudice caused by the loss of business and unproductive capital during the four and a half years' occupation by the German armies.

Not a single Belgian automobile factory was destroyed or damaged by what may be termed direct warfare. The factories were at Brussels, Liège, Antwerp and in the Charleroi districts and were passed so rapidly by the German advance of August, 1914, that they were soon far inside the German lines and consequently never were within the range of the artillery. Notwithstanding the fact that they were outside the fighting zone, the Belgian automobile factories are ruined. The buildings stand, as in 1914, and to a casual observer appear to be undamaged. But a look inside shows that they have been stripped naked.

In any country at war it is expected that destruction

MR. BRADLEY, special European correspondent of AUTOMOTIVE INDUSTRIES, went to Belgium to investigate industrial conditions there especially for this paper. He was accorded special privileges by Government officials and owners of the various plants.

—EDITOR.

will be found. When the security of a nation is at stake, the home forces may be under the necessity of destroying property to the same extent as the enemy. This article, however, does not relate to necessities of war but to a deliberately organized, and unfortunately successful, attempt to destroy an industry in order to remove a competitor.

The Belgian automobile industry was not big. In 1914 it consisted of fifteen firms, the most important of which employed 3000 men; the total production was 8000 cars per annum.

The truck industry was non-existent.

Agricultural tractors are unknown in Belgium.

In the Brussels district there had been built up an interesting customs body-building industry, which received chassis from England, France and other nearby countries and returned them completely equipped with made-to-order bodies. Of the total output of the Belgian automobile factories, 70 per cent was for export. By destroying this industry, Germany felt she would have one less competitor to meet on the resumption of business after the war.

If an indictment of the German government was desired, the automobile industry would not be selected as an

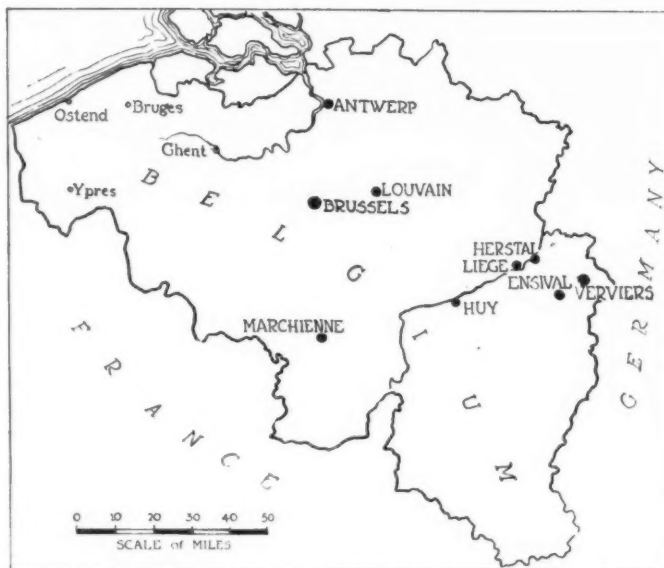
Belgian Automobile Factories, Placed Roughly in Order of Importance

FACTORY	PLACE	CONDITION
Minerva	Antwerp	Completely stripped.
Metallurgique	Marchienne-au-Pont	Used as German repair shop; partly stripped.
F. N.	Herstal-lez-Liège	Lost 3600 out of 3800 machine tools.
Pipe	Brussels	Completely stripped.
Excelsior	Saventhem, near Brussels	Completely stripped.
Nagant	Liège	Completely stripped.
S. A. V. A.	Antwerp	Completely stripped.
F. A. F.	Brussels	Completely stripped.
F. I. F.	Brussels	Completely stripped.
Miesse	Brussels	Completely stripped.
Springuel	Hug	Completely stripped.
Germain	Monceau-sur-Sambre	Destroyed by fire.
Imperia	Nessonvaux	Completely stripped.
Linon	Ensival-lez-Verviers	Completely stripped.
Dasse.	Verviers	Completely stripped.
Derihon (forgings, alloy steels)	Liège	Completely stripped and wrecked.
Dyle & Bacalan (frames, etc)	Louvain	Wrecked and burned in sack of Louvain.

example. While the sum of \$10,000,000 represents the value of practically the whole of the machinery employed in the production of automobiles in Belgium, the total is too small in these days of colossal figures to strike the imagination of the masses.

The mining industry and the general engineering industry were bigger prey and, although the proportions are the same, the figures are much more impressive. To take one particular instance, there was at Seraing, a few miles from Liège, the John Cockerill Engineering Co., employing 10,000 men on the production of railroad material, steam engines, Diesel engines, cranes, etc. Externally the factory is in good condition. The words "Vive la Belgique" adorn its façade. The windows are unbroken, the bricks and tiles are all in place, everything is cleanly. But inside the destruction is so complete that the chief engineer declared to me: "I should very much have preferred that the whole place had been wiped out by a bombardment. In that case we could have drafted a new plan and have built an entirely modern factory. As it is, our walls are intact, but the machinery is gone, and we are obliged to rebuild within the old walls and with the old limits and restrictions."

Not a shot was fired over the Cockerill factory, yet destruction has been effected to the extent of \$13,000,000 on 1914 values and more than 8000 work people have been deprived of their means of livelihood. When the German armies took possession of Belgian territory Cockerill was asked to work for the invaders. He re-



Map of Belgium

fused. For a few months work in the factory continued, on a reduced scale, for the home and the Dutch markets. But as raw material became scarce and as the difficulties of preventing the products finding their way into Germany became greater the factories were closed.

Germany was early in the field for the Cockerill machinery. The high-class tools were removed by official requisition. Engineers from Germany came, examined, photographed, went home, and returned with orders to take possession of individual machines. There was keen competition for many of the best machine tools. One

particular installation was photographed and reported on by ten organizations. Officers and engineers quarreled in the factory for the possession of this machine. Finally an officer and soldiers arrived, with a duly signed order from the central German authority at Brussels. A freight car was run alongside the machine, the locomotive remained hitched up, and within an hour, by the aid of the overhead crane, the machine had been loaded and had disappeared. An hour later another officer arrived with a signed order for the same machine. He rushed to the railroad station, but the car had gone; telegraphic messages were sent in every direction, but neither the Belgian nor the German authorities could discover where the machine had been taken to.

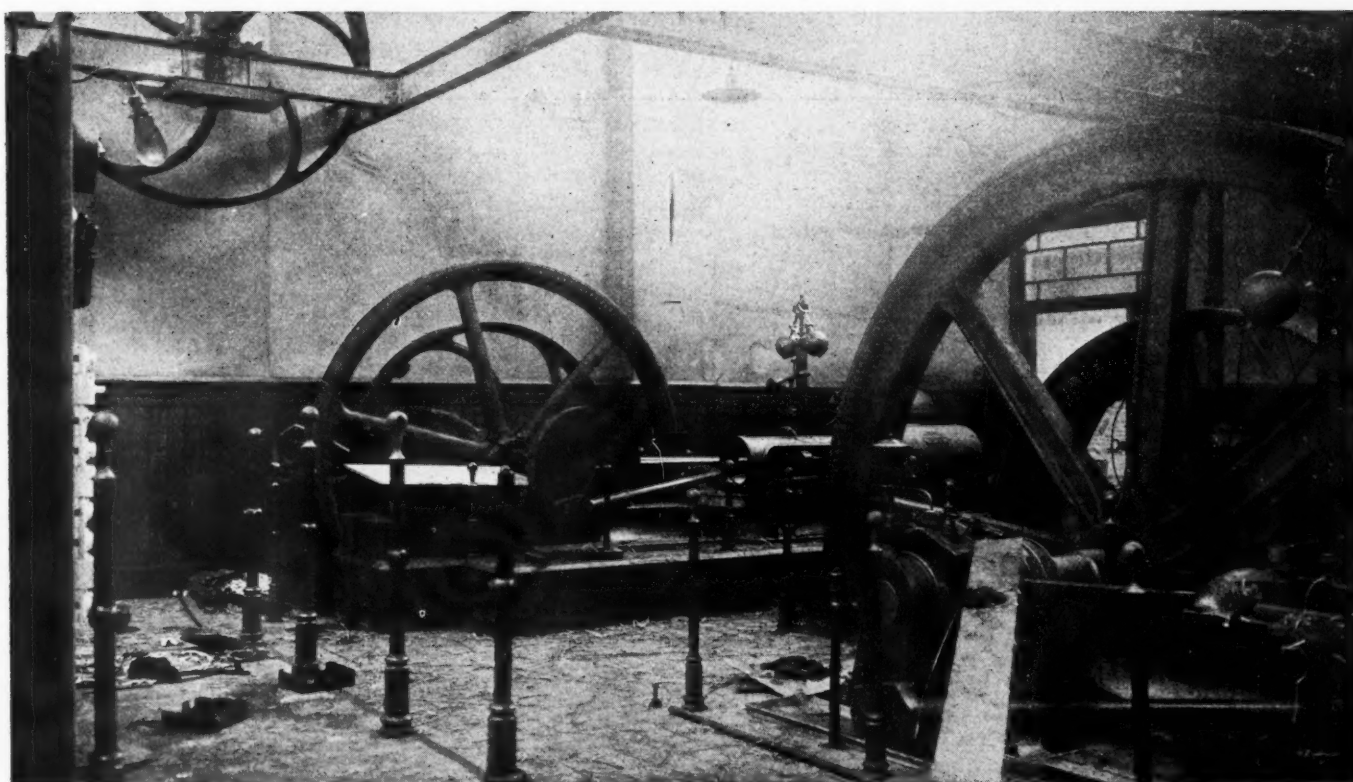
In 1914 the Cockerill company had built a gas engine of 10,000 hp. This was the biggest engine of its kind in the world and had been produced for the Cockerill generating station to save the space taken up by the small

Derihon Machine Shops as the Germans Left Them

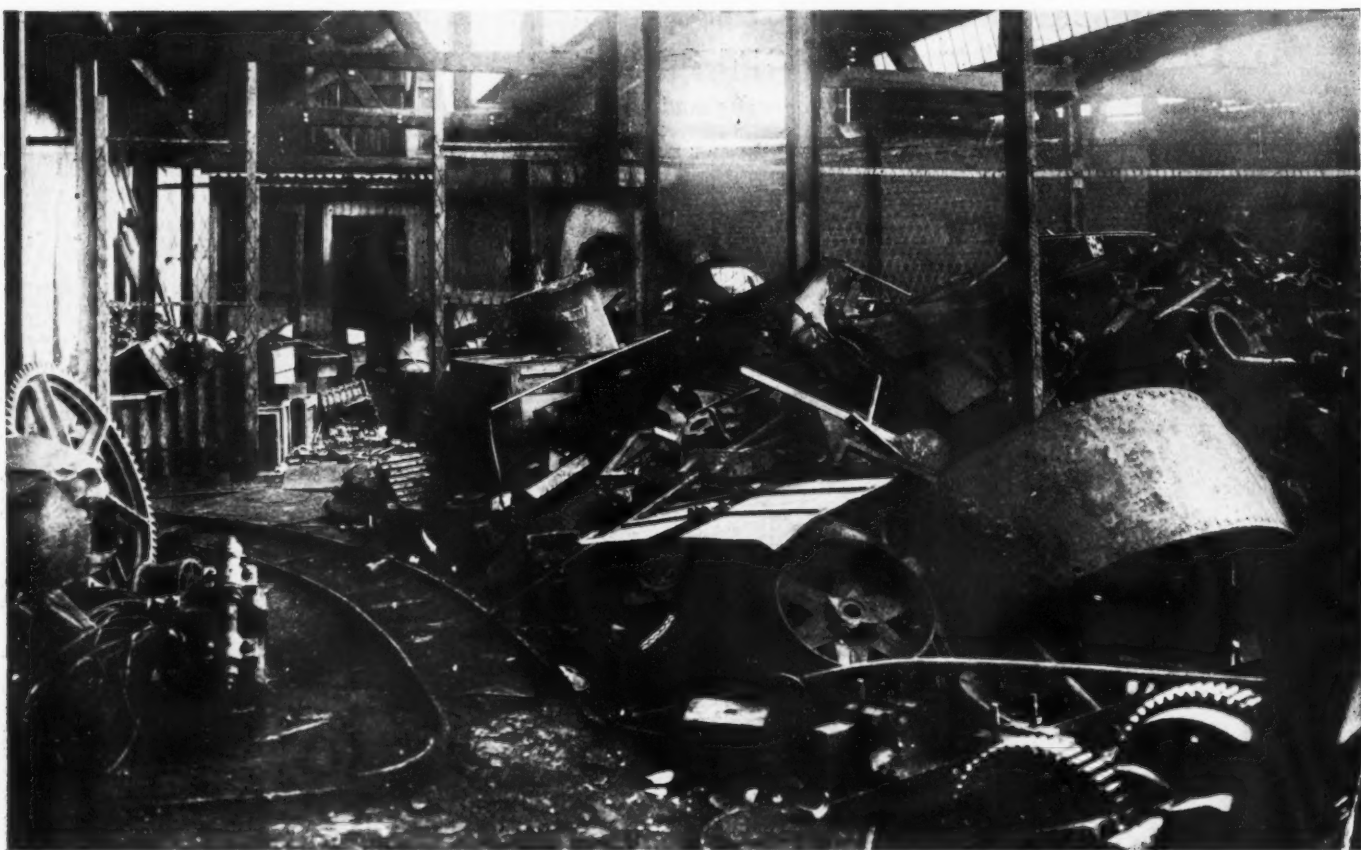
(Photographs made Nov. 11, 1918)



*This shafting had been pulled down and was awaiting shipment into Germany.
The boiler was pulled out and all tubes sawn through*



Engines rendered useless and marked for removal



Machinery in Derihon plant broken up by order of the German authorities. This scrap had been ordered sent into Germany. Many such piles awaited shipment Nov. 11, 1918

individual engines and to prove that there was no practical limit to the size of gas engines.

The German engineers coveted this engine. A requisition order was presented authorizing its removal, and the directors given 4 hours in which to produce the assembly drawings; if not delivered within this time the directors of the factory would be deported to Germany. The 10,000-hp. gas engine, together with its dynamo, was shipped to Germany and is in operation in that country at the present moment. In order to dismount it rapidly the whole of the building in which it was housed was destroyed and the holding-down bolts were cut with an acetylene torch.

Even the electric standard and lamp at the entrance to the engine house were taken to Germany. A few of the machines were of German construction, and in several of these cases it was the German engineer responsible for the installation who took charge of the removal of the machines to Germany.

Until May 25, 1918, it was possible, by entreaty, by persuasion, by argument, to induce the Germans to respect portions of the plant which were absolutely essential to a resumption of activities. But on May 25 the R. O. H. M. A. swept down on the Cockerill factory and systematic destruction began and was continued without a stop until 10.45 a. m. Nov. 11, 1918—15 minutes before the armistice went into effect.

The R. O. H. M. A. was the terror of the Belgian factories. This organization was charged with the task of obtaining metal. If it could secure \$500 worth of cast iron by destroying \$10,000 machines it did not hesitate for a second. At the Cockerill factory the R. O. H. M. A. organization was in charge of Von Dip. Ing. C. Quasebart, professor of metallurgy at the German University of Aix-la-Chapelle. This von engineer proved a remark-

able leader and should be capable of giving valuable instruction at his university on rapid and up-to-date methods of wrecking factories.

When Von Quasebart took charge at the Cockerill plant the great German offensives had been launched and appeared likely to succeed. Said one of the German officers to Mr. Tonneau, director of the Cockerill company: "This is the beginning of the end. We are certain to win. We shall not have to pay a cent to Belgium; we can do as we like." Add to this the fact that the only real competition the German engineering industry had to meet in the Dutch and Scandinavian markets came from Belgium and we have the explanation of the mad destruction ordered by the German authorities and executed by the R. O. H. M. A.

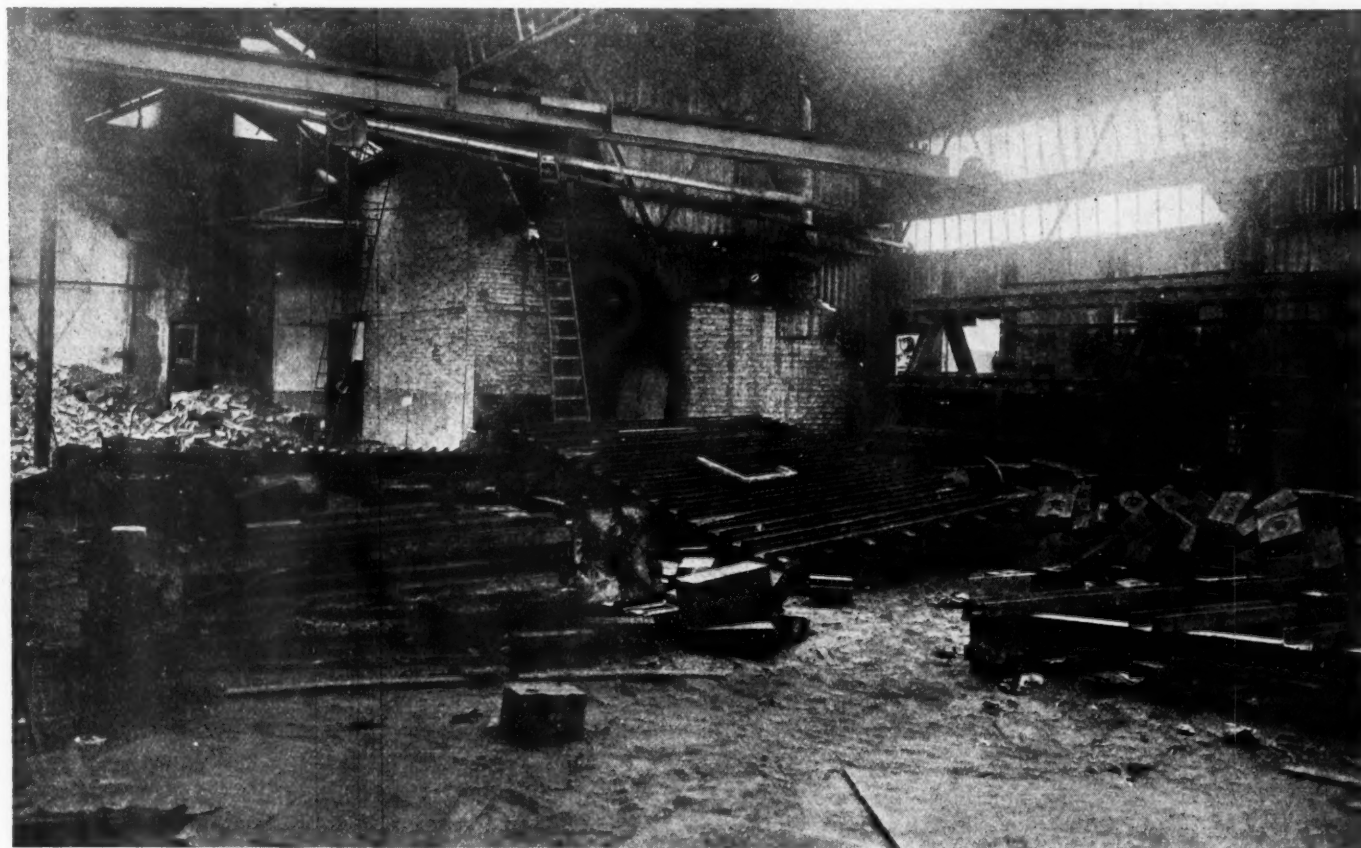
Germany's requirements, in order of importance, were copper, brass, rubber, leather, cast iron and steel. But when the R. O. H. M. A. came on the scene only iron and steel remained and the only object was to get scrap metal for the furnaces. In some cases overhead traveling cranes had been demounted and sent into Germany for further use. This so seriously interfered with the wrecking gangs that a general order was issued forbidding cranes to be destroyed. The method of operation was to cut the holding-down bolts with the acetylene torch, hitch the crane to a machine and drop it from a height of 6 to 12 ft. to break it. From their own standpoint the method was uneconomical, for from 20 to 25 per cent of the metal became embedded in the earth and could not be collected.

Nothing escaped: blast furnaces, rolling mills, cupolas, gas and steam engines, boilers, shearing machines, lathes, hardening furnaces, even the steel columns supporting the roofs of the buildings were pulled down and scrapped.

The first instruments employed were the acetylene

The Derihon Buildings Suffered Less Than Plant

(Photographs made after the armistice became effective)



This building was stripped of the steel portions and this was to be used as scrap. In the background the walls have fallen as result of removing pillars. Note the dies, which are treated as scrap



To facilitate the removal of machinery, the German troops destroyed a portion of this building

Herr v. d. Plas in Brüssel
hat dem Kraftwagenpark Brüssel ein *Chassis*
überlassen.

Marke: *Sheffield Simplex* Fabrik-Nr. *1157*
P. S. *30* Anzahl der Plätze: *21168*

Karosserie: _____
Zubehör: _____
Zustand: _____

im Werte von Mark *4800* in Worten:
Mark viertausend achthundert
und ist berechtigt, diesen Betrag aus der Kasse des Kraftwagenparks Brüssel,
Güthaus-Kriegsministerium, Löwenstr. Nr. 1, 1. Stock, Stufe 39a, Werktag,
mit Ausnahme von Samstag, in der Zeit zwischen 3 und 5 Uhr nachmittags
zu empfangen, da Besitze in England

Brüssel, den *10* DEC 1914 191

Die Ankaufskommission:

Imma *Reilsson* *Kühler*
Hauptmann. *KAC* *Charingemius*

Dieser Kraftwagen hat im Park Brüssel die Nr. _____ erhalten.
Unterschrift des Uebernehmers im Park Brüssel: _____

Receipt given by the Germans for a seized Sheffield-Simplex chassis. The price allowed for this new chassis is 4,800 marks (approximately \$1,200). The market value was \$6,000

torch—it was too slow to unscrew nuts—and the crane. So great was the effort in tearing up machinery that the hook of the most powerful overhead crane was broken. Where no overhead crane existed, a block and tackle was attached to the girders. Engineers would have feared that the entire building would collapse. The Germans had the luck merely to break the girders.

For the big machinery, dynamite was used. If a building made the removal of a machine difficult, the building was destroyed. In some cases, after the holding-down bolts had been cut, the desired machine was attached to a traveling crane mounted on rails in the yard, and pulled through the window. After the first two or three efforts the opening was large enough to allow the free passage of the biggest machinery.

The Cockerill plant is described as an example of destruction on the biggest scale. The treatment accorded to the Derihon Brothers plant differed only in volume. A few miles to the north of Liège, the Derihon company possessed a modern plant devoted exclusively to the production of forgings and stampings for the automobile industry. Derihon B. N. D. steel had a universal reputation, and was always employed when the very best was desired. As an indication, practically all the essential parts of Peugeot and other French racing cars built before the war, and now in America, were of Derihon B. N. D. steel.

When the invasion began, one of the Derihon brothers escaped to England, where he erected a factory for the production of special alloy steels for automobiles and airplane engines. The technical staff, left behind, began the manufacture of shock absorbers in order to keep the workers employed and to forestall any excuse the Germans might offer for seizing the machinery. In 1916

the factory was asked to work for Germany. It refused, was threatened, and refused again. In consequence the plant was sequestered, or put into the hands of an official receiver. The plan was to remove the entire Derihon plant into Germany where it would be put into operation as a direct competitor after the war.

German engineers, who were specialists in the making of forgings, came to the factory, exacted the plans under threat of deportation, and superintended the removal of machinery and plant. One of these specialists was photographed. His name is not known, but the company he represents is the Rhein-Elbe Gelsenkirschner A. G. Abt. Aachener Hütten-Verein, at Düsseldorf. It is declared that the entire Derihon plant was to be transferred to this firm. The entire laboratory disappeared; the microscopic camera, the Brinell machines, the impact testing machines, the pyrometers, the chemical apparatus, the test pieces, even the diagrams, photographs, and charts on the walls were sent into Germany.

All Machinery Despatched to Germany

The furnaces, forges, drop hammers, presses, compressors, blowers, lathes, shearing machines, power saws, shafting, belting, wiring, electrical equipment were all pulled down, loaded on freight cars and despatched over the border for the benefit of the German industry. It was not until 1917 that the real work of destruction began, but during these 18 months the enemy had the time to tear out every machine and to remove every inch of shafting. The two steam engines were left behind, although marked for removal, but all the steam pipes were broken with a hammer and the boiler was pulled out and the tubes sawed through.

The wreckage was piled up at one end of the building until it went through the glass roof. Although everything had been torn out and labeled for shipment to Germany, time had been too short to get it all loaded on freight cars. At midday, Nov. 11, 1918, when the armistice became effective, German soldiers came to the factory to load goods for Germany. The Derihon staff had the satisfaction of kicking them out.

Derihon never was visited by the terrible R. O. H. M. A. But evidently there are other organizations no less destructive, for when it was abandoned the Derihon factory was in a condition defying description.

After practically everything had been removed it was learned from one of the soldiers that all the dies were to be taken for scrap metal. To avoid this terrible loss, the small staff left at the works smuggled many of the dies to a place of safety. The German soldiers saw the men at work and even helped to load some of the dies on a wagon, but were satisfied with the explanation that this was being done to facilitate the work of the soldiers who were to come on the following day. The officers were not so easily fooled. The manager of the factory was court-martialed and kept in prison for 3 months.

The Germans gave receipts for all machinery they requisitioned. Sometimes this was done correctly, sometimes it was not. At the Derihon factory one army department gave a receipt for goods seized and shortly afterward another army department took that receipt away by force. Derihon does not possess a single original receipt for machinery seized. The precaution was taken, however, of photographing all the receipts before the German officers caused them to be given up. One of these photographed receipts is shown on this page.

[In a further installment of this article Mr. Bradley describes other factories he visited by special permission granted to him as the representative of Automotive Industries.—Editor.]

When the Germans Left the Derihon Offices

(Photographs made Nov. 11, 1918)



A corner of one of the offices



Office of the general manager as the Germans left it



Portion of the main office. German troops lived here

Four Wheel Drive Trucks

Militor Four Wheel Drive Ordnance Truck Described and the Reasons for Its Design Discussed Before S. A. E. Metropolitan Section

THAT there is a wide field for the four wheel driven truck in commercial work was asserted by George Dunham and L. C. Freeman, in a paper read at the last meeting of the season of the S. A. E. Metropolitan Section, held on Thursday of last week. This field extends all the way from where that of the two wheel driven truck leaves off to where that of the chain track tractor begins. Mr. Freeman claims not only better weight distribution and greater adhesion under difficult traction conditions, but also asserts that as regards fuel economy and tire mileage, the two wheel driven truck will have to look to its laurels.

In the introduction of his paper Mr. Freeman explained that the subject would not be covered as broadly as the title "Four Wheel Drive Trucks" might indicate. He had been associated with Mr. Dunham in the development of the ordnance four wheel drive truck, and it was his purpose to describe the features of this truck and give reasons therefor.

The Ordnance Department saw the necessity for the use of the four wheel drive in trucks where the conditions of operation were very severe. The Militor Corporation was asked to develop a four-wheel-driven truck, and the author said that he wanted to acknowledge at this time the invaluable assistance that was given the engineering staff of the company by outside consulting engineers, and by the engineers of parts makers and other truck makers.

Features Desired by Ordnance Department

At the outset, elaborate and continuous tests were made on all four wheel driven trucks then manufactured in this country, as well as on a four wheel drive Renault tractor. Some of the features that the Ordnance Department insisted upon were high-ground clearance; light weight, short turning radius, short front overhang and low center of gravity.

In the design of the trucks, two objects were kept in view, namely, the greatest production possibilities and maximum interchangeability, even with parts of other vehicles. It was also endeavored to make the truck symmetrical as far as possible, as this tended farther toward interchangeability. One of the principles laid down for the design was that as each problem arose, it should be considered basically as a problem and anyone called in for consultation should be either convinced that the design selected was right, or else the plan of the consultant should be adopted.

In the first place it was decided that the standard seating arrangement, with the driver behind the engine, should be adopted. Next, on account of the requirement of a high-ground clearance, it was decided to adopt the internal gear driven axle, with the differential located on top of the axle.

When the problem of selecting a suitable engine came up, it was first suggested to make use of the Military Class B engine, but this plan was abandoned because it was found possible to obtain an engine already in production, which permitted of making the front overhang of the truck 6 in. less, and which also reduced the weight

by 350 lb. The radiator was placed back of the engine, the chief reason for this being that it tended to reduce the front overhang. The reason for making the front overhang small, was clearly brought out in some of the moving pictures shown, which illustrated tests made with the truck under the most unusual and difficult conditions. If there is a large overhang in front, if the front wheels go into a ditch, the forward end of the frame is likely to strike the opposite bank. The picture showed that the Ordnance truck had no trouble of this kind.

Hele Shaw Clutch

For the clutch, the Hele Shaw was selected. It was found that it would be necessary to use a four-speed transmission with an unusually high reduction low gear, and the class B truck transmission was adopted, with the exception that the low gear was made special. The gear reductions required were worked out on the basis of the traction ability which had been specified for the class B truck. It was figured that in a two wheel driven truck only 80 per cent of the total weight is available for traction purposes. Hence, in a four wheel driven truck of the same total loaded weight, the traction ability should be greater in the proportion of 10 to 8. The Ordnance four wheel drive truck is a 5-ton machine and a gross weight of 16,000 lb. was figured upon, but as a matter of fact, the truck did not come out quite as light as had been expected. Gear reductions were selected in accordance with the traction effort requirement on high and low gears, the high gear reduction chosen being 9.6, and the low gear reduction 73.6:1. With this high gear reduction ratio and 40 in. wheels, the truck travels 15 m.p.h., at an engine speed of 1210 r.p.m.

While standard units were selected as far as possible, the transfer case, that is, the member through which the power is transmitted from the end of the transmission shaft to the propeller shaft, has no equivalent on two wheel driven trucks, and had to be designed specially. In the design of this member, consideration was given to the different methods of power transmission by spur gears, silent chain, etc., and a decision in favor of the silent chain was finally made. Means for adjusting the chain tension were provided which allowed of using the chain for a much greater length of time. The two chain wheels of the transfer case were made of nearly equal size, so that by interchanging them, a different reduction ratio could be obtained.

Universal Joints and Propeller Shafts Identical

The two universal joints and propeller shafts were made identical and interchangeable. The differential housings of the front and rear axles were also made identical and interchangeable. Brakes were located on both sides of the differential housing.

It was known in advance that the truck would be used under very difficult conditions, and the greatest attention was paid to provisions against frame distortion. Full 3 point suspension is used, and the drive and torque reaction are taken up on the spring. The latter are symmetrical and interchangeable.

There were really only three parts to the truck that were entirely new, these being the axle, the transfer case and the radiator, all other parts being stock parts which could be purchased in the open market. The truck was provided with a winch which was designed with a reduction gearing of such power as to be capable of breaking a new 1½-in. manila rope.

Commercial Use of Four Wheel Driven Truck

In concluding his paper, Mr. Freeman made some references to the outlook for the four wheel driven truck in the commercial field, stating that this type of vehicle fitted in between the two wheel driven truck and the caterpillar. He admitted that there were more parts on a four wheel driven truck, and that the cost of manufacture would be slightly greater, but said these parts were duplicates of other parts, and they were smaller than the corresponding parts on a two wheel driven truck. The tire life, he said, had been found very satisfactory with four wheel driven trucks, which was probably due to the fact that since the driving effort was divided between all four wheels, the strain on the tire was comparatively low. In regard to fuel consumption, also, he regarded the four wheel truck as on a par with the two wheel driven machine.

Colonel L. B. Moody, of the Ordnance Department, who is in charge of the transportation of this department, was present, and made some remarks on the need for four wheel driven trucks in ordnance transportation. Colonel Moody said that the four wheel driven truck described in Mr. Freeman's paper was one of the finest pieces of engineering work ever turned out for the Ordnance Department. He dwelt at length upon the reasons why four wheel driven trucks were needed for ordnance transportation. In connection with military operations, there are two kinds of transportation: transportation directly behind the fighting line, where the roads are usually torn up by shells, and transportation in the rear. The former constitutes practically 50 per cent of all the transportation work necessary.

Two Wheel Driven Trucks Fed Guns at Front

The point has been made that our Allies used very few four wheel driven trucks, but this was due to the fact that they used animal transportation very largely, directly behind the lines. The American Army discarded animal transportation on account of the difficulty of getting the horses to Europe and of shipping the necessary feed. Under certain exceptional conditions, two wheel

driven trucks could be used effectively close to the battle-front. Thus, during the Somme battle, a couple of days before the British took Peronne, two wheel drive trucks fed the guns at the front very nicely, but this was possible because the Germans in their retreat, for one reason or another, failed to mine the roads. Directly north and south of the section to which this remark applies, there was hardly a ghost of a road, and even a tank had trouble in getting ahead.

Experience With Trucks at the Front

During the American offensive in the Argonne, some two wheeled trucks were also being used for hauling up ammunition, and they got stuck promptly. The ammunition was thrown off, and they could not even extricate themselves when empty, with the result that the road was blocked for four hours. When the Ordnance Department cut out horse transportation, it had a choice between four wheel driven trucks and caterpillars. The latter were largely used, but owing to the larger field of service for four wheel driven trucks it was decided to also develop this class of vehicle.

Some additional information regarding the Ordnance truck was brought out in the discussion. Thus, it was stated that one reason for the rear location of the radiator was that it was better protected against shocks in that position. Self-locking type differentials were used, and gave very satisfactory service. It was known in advance that these would see very severe usage, and thus what might be called an oversize was selected. The Ordnance 5-tonner was made both as a truck and as a tractor, and one of the differences between the two models was that the truck had two wheel steer, while the tractor had four wheel steer. In the tractor, both the front and rear axles were identical and interchangeable.

No Trouble with Locking Differentials

In answer to a question, Mr. Dunham said that some of the trucks had been run 25,000 to 30,000 miles and not the least trouble had been experienced with locking differentials, which, when they had been taken out, had looked as good as new. As regards fuel consumption, it was stated that the truck would do 3½ miles on a gallon of gasoline.

It was found that in order to secure traction under the most difficult conditions it was necessary to use 14 chains on each wheel. At first only 6 chains were used, but on soft or slippery ground the wheel would begin to slip when no chain was on the ground and would dig itself in.

Resistance of Animal Glues to Moist Air

THAT there is a close relation between the viscosity, and therefore the grade of animal glues and their moisture resistance is strongly indicated by recent tests made at the Forests Products Laboratory.

Test specimens were made of two pieces of ¼-in. birch veneer glued together with the grain in opposite directions so as to give 1 sq. in. of glued joint surface. The specimens were suspended in a humidity chamber with a 1-lb. weight hung on each, and the time required for failure of the glue joint was noted. The first two tests were made at 98 per cent humidity. In the third test the specimens were kept at 90 per cent humidity for 120 hours, after which the humidity was raised to 98 per cent. No failure occurred at 90 per cent. The temperature used in each test was about 80 deg. Fahr.

The results indicate that the moisture resistance of animal glues is proportional to the viscosity, jelly strength and grade.

Resistance of Glues of Different Viscosity to Moist Air

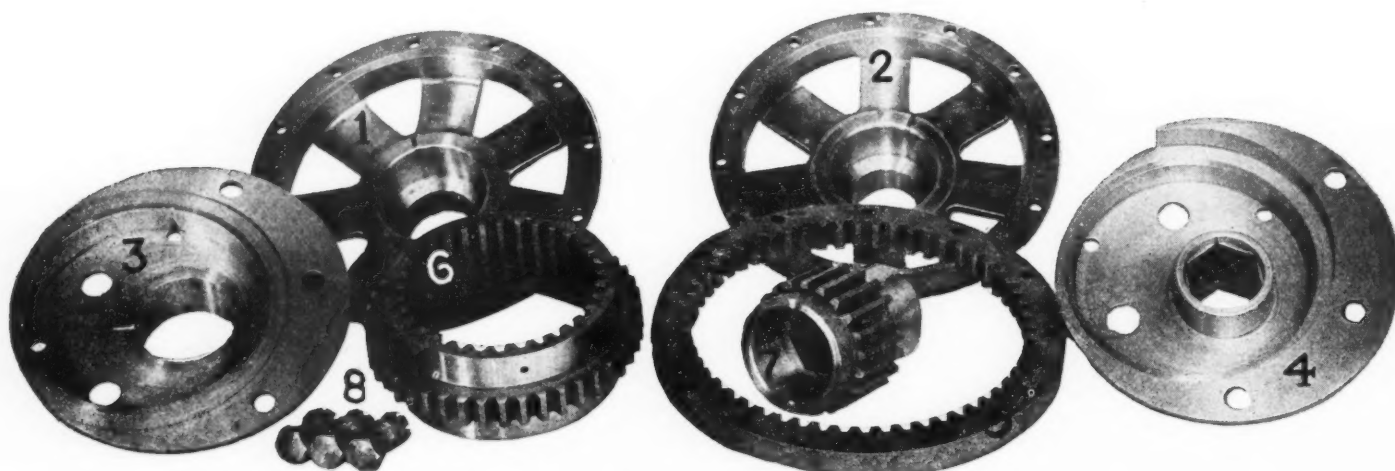
GLUE USED			TEST NO. 1		TEST NO. 2		TEST NO. 3	
No.	Relative Viscosity (Engler)	Jelly Strength by Smith Tester	No. Specimens Used	Average No. Hours Before Failure	No. Specimens Used	Average No. Hours Before Failure	No. Specimens Used	Average No. Hours Before Failure†
13	1.62	222	2	10½	4	12	4	24
7*	...	...	...	...	4	12	4	24
36	1.70	219	2	12½	4	14½	4	24
37	1.92	256	2	13	...	...	4	44
34	2.00	267	2	17	4	26½	4	48
35	2.90	315	2	42	4	36	...	...
19	4.98	356	4	50½	...	...	...	...
21	4.14	338	...	...	4	48	4	66
9	5.48	416	...	...	4	66½	4	198

*A vegetable glue.

†After raising humidity to 98 per cent.

The Elbertz Positive Drive Differential

An Adaptation of the Epicyclic Gear to a New Purpose—Prevents Slipping of Wheel Without Traction and Drives Through Inner Wheel at Corners



Parts of the Elbertz positive drive differential

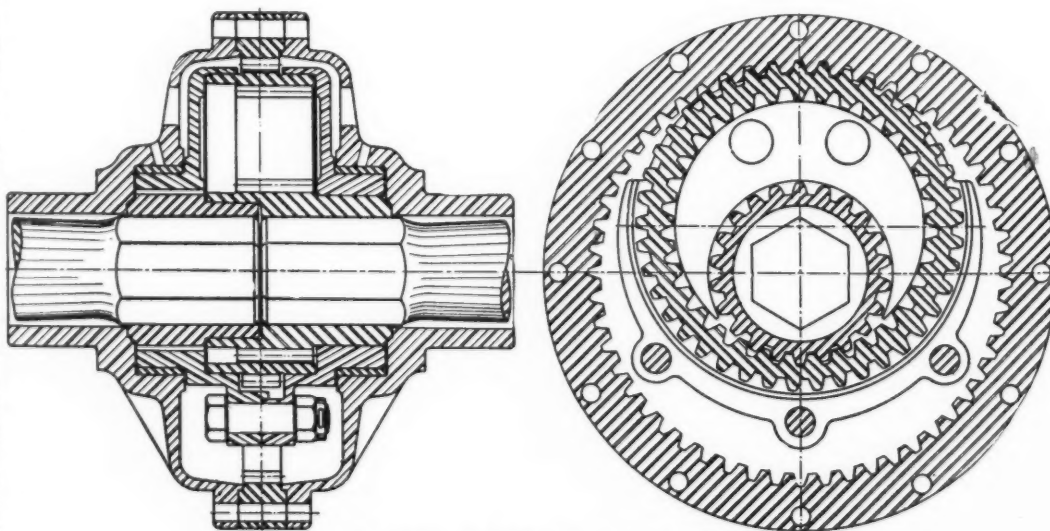
THE Elbertz positive drive differential is a new design of differential gear intended to obviate spinning of drive wheels and consequent loss of traction when one wheel of a truck or car gets onto a piece of slippery road. When driving straight ahead it distributes the power to both driving wheels up to the limit of their respective traction abilities. Under normal conditions the power is delivered equally to both wheels, but when the traction limit of one wheel is reached the excess power is delivered to the other wheel up to the limit of its traction. In turning corners it allows the outer wheel to run ahead of the inner one.

The Elbertz differential comprises seven main members, as shown in the accompanying illustration. These are known, respectively, as the differential cases 1 and 2, the crank members 3 and 4, the internal gear case 5, the intermediate gear 6, the shaft gear 7, and three sets of bolts and nuts 8, the latter retaining the two crank members as one unit when assembled. This differential gear is an ingenious arrangement of an epicyclic train of gears, consisting of an internal gear case 5, secured to the differential housing, 1 and 2, which in turn meshes with intermediary gear member 6. The latter can revolve about a bearing on the crank arm or eccentric member 3, 4. The eccentric member engages with one axle shaft and turns with it. The other axle shaft engages with shaft gear 7, the latter meshing the internal teeth of the intermediate gear member 6.

We are informed that the parts shown in the illustration were photographed after being in service in a prominent make of $3\frac{1}{2}$ -ton truck, which had covered approximately 9000 miles up to the time of disassembling. We are also informed that several axle

builders have secured manufacturing rights from the B. F. Everitt Co., of Detroit, the licensor, and are now producing differentials for their own requirements.

WITH so-called closed circuit battery systems of ignition the contacts of the interrupter may remain in closed position when vehicle stops. This causes overheating of coil and runs the battery down. In order to prevent this from occurring, a method is given in French Patent No. 486105 of the Soc. Anon. pour l'Equiment Electrique des Vehicules. A relay is provided by which the current flowing in the primary winding of the spark coil is interrupted. The current taken by the relay winding has to pass through a filament of one of the rare earths that only become conducting at high temperatures. The heating of this filament is produced by a resistance in the circuit of the primary winding. The relay is so designed that, having acted at a given temperature of the filament, the primary circuit of the spark coil is kept open until it is closed by pressing a knob that resets the armature of the relay.



Two sectional views of Elbertz positive drive differential

Diesel Engines for Automobile Work

Method of Fuel Injection and Conditions of Combustion Limiting Factors— Fuels Available for Use in Diesel Engines

SOME light was thrown on the difficulties encountered in adapting Diesel engines to automobile work in a recent paper by Charles Day before the Institution of Automobile Engineers. According to Mr. Day, the method of introducing the fuel into the cylinders and the conditions of combustion are at present the limiting factors.

In regard to the spraying of the fuel into the cylinder, it will be readily appreciated that time is a factor in forcing oil through a pulverizer, also that as the viscosity of the oil increases the time required to force the oil through will increase, unless the pressure behind the oil is increased or the design of the pulverizer modified. With free-flowing petroleum residue oil, and with an air pressure of about 1000 lb. per square inch, the author is of opinion that pulverizers of prevailing designs can, with suitable oils, be arranged to deal with speeds up to about 500 or even 600 r.p.m. At 600 r.p.m. the time during which the oil has to be sprayed into the cylinder is approximately 1/200 of a second. For higher speeds pulverizer modifications will need to be developed.

The character of the fuel oil is a factor in the permissible engine speed, both from the point of view of pulverization and of combustion. Viscous oils are more difficult to pulverize than thin and free-flowing oils, and cannot be put through a pulverizer so quickly.

Rate of Combustion Dependent Upon Fuel

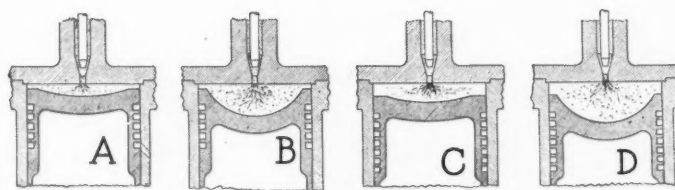
Again, the combustion of heavy and tarry oils is not so rapid as that of refined oils, such as kerosene or gasoline, and if the engine speed is so high as not to allow sufficient time for the combustion of the fuel, difficulties will arise from sticky valves, smoky exhaust or dirty cylinders. For rapid combustion, a very finely divided spray is of importance, as obviously large drops of oil take a longer time to burn than very small ones.

From this it would seem that high speed engines may need refined oil, in which case one of the great advantages of the Diesel engine will disappear.

The fuel is sprayed into the cylinder during a very short period of the stroke, commencing with the piston at approximately the top of the stroke. With a short stroke engine the combustion space into which the oil has to be sprayed is very shallow, as owing to the high compression necessary the clearance volume must be low, say about 7 per cent of the total cylinder volume. Remembering the small clearance space, the difficulty of spraying the oil so as to distribute it throughout the air is obvious. Failure to thoroughly mix the oil spray and air will lessen the possible power of the engine by reducing the quantity of oil which can be burnt.

Improvement in distribution is obtained by dishing the piston top. In the accompanying illustration, A shows diagrammatically the best obtainable combustion space for a short stroke engine, assuming reasonable clearance between the outer edge of the piston top and the cylinder head, while B shows the possible shape of combustion space if the stroke of the piston is doubled.

The combustion space at the latest point of fuel admission is shown by C and D respectively. A glance at these diagrams shows how much easier the spraying problem becomes in the long stroke engine than it is in the short stroke engine,



Form of combustion chamber with short and long strokes respectively at beginning and end of fuel injection period

especially when it is remembered that it is desirable to avoid spraying or splashing the fuel oil on to the water-cooled cylinder head or on to the piston.

In connection with gasoline engines, much attention has been given to the production of a turbulent condition of the gases at the time of ignition; in the author's view such a condition

at the commencement of spraying-in is not so important in a Diesel engine, but, on the other hand, a considerable amount of turbulence should result from the spraying-in of the oil so as to insure the utmost possible mixing of the oil and air.

Another factor which must be kept in mind for automobile work is range of speed. In the Diesel engine ignition depends upon the temperature of the air at the end of compression, but if the speed of the engine is reduced very much it may happen that the cooling effect on the slowly compressed air is enough to prevent the compression raising the air temperature sufficiently for ignition. There is thus a limiting factor to the slowness of speed, and the range of speed permissible with the Diesel engine is not so great as with gasoline engines, in which the ignition is obtained by means of a spark.

Difficulties to Be Overcome

Before Diesel engines are likely to be applied extensively to automobile work, development along the lines indicated will be necessary, so that higher speeds of rotation can be adopted and reduction of space and weight thus secured.

The difficulties to be overcome before the Diesel engine is suitable for automobile work have been stated, but it is important to make clear that the expression "automobile work" is not intended by the author to cover locomotives, for the Diesel engine as at present developed is applicable to locomotive work, and should find an important field there, owing to the great economy of working. For outlying districts and for long journeys through sparsely populated areas and countries, locomotives operated by Diesel engines should prove very advantageous, as for such districts electrical operation from fixed power stations is unsuitable.

Compared with the steam locomotive of existing types, the internal combustion locomotive would be cheaper in fuel, and would, if operating electrically, give much higher torque both when starting and when climbing stiff gradients, and it would also use a much smaller quantity of water. Reliability in service and a reasonable cost of upkeep will come with experience. The elimination of stand-by losses and immediate readiness for use are factors of importance in this service.

Fuel Oils

A very wide range of fuel oils can be used in Diesel engines, as, for instance, petroleum residues, tar oils, some crude tars, shale oils, kerosene, naphtha, alcohol or gasoline. Gasoline is only mentioned to illustrate the wide range of fuels permissible, and not as a desirable fuel, for obviously the much cheaper oils would be selected. As already explained, the working of the engine depends upon the spontaneous ignition of the oil when sprayed into the hot air in the combustion space—hence the temperature at which the spontaneous ignition of different oils occurs is a matter of importance.

The Bargaining Tariff

THE United States should have the means of properly protecting itself whenever our trade is discriminated against by foreign nations, in order that we might be assured of that equality of treatment which we hope to accord and to promote the world over. Our tariff laws as they now stand provide no weapon of retaliation in case other governments should enact legislation unequal in its bearing on our products as compared with the products of other countries. Though we are as far as possible from desiring to enter upon any course of retaliation, we must frankly face the fact that hostile legislation by other countries is not beyond the range of possibility and that it may have to be met by counter legislation.—PRESIDENT WILSON in *Address to Congress*.

WHEN President Wilson mentioned a retaliating tariff, or as it is commonly known, a bargaining tariff, in his address to the present session of Congress, he touched upon a problem that is being seriously considered by the Departments of State and Commerce and the U. S. Tariff Commission. His plan, which calls for a bargaining tariff that will allow the United States to enact discriminatory provisions against foreign countries that discriminate against us, is one which has been approved of by the U. S. Tariff Commission, but is looked upon as a doubtful measure by other governmental departments and officials.

The bargaining tariff is a system somewhat different from the European policies. France, for example, has a maximum and minimum system in which there are two rates fixed by the Legislature, according to the statement made by William S. Culbertson, member of the U. S. Tariff Commission, in an address before the Sixth National Foreign Trade Convention.

Germany, he said, has a general and conventional tariff system in which there is a general schedule of rates fixed by legislation and a lower conventional schedule of rates fixed by bargaining with other countries and embodied in treaties and conventions.

The United States has clung to the single-tariff system with only occasional attempts to make it more flexible. It now proposes to enter upon the policy that a nation deserves and seeks equality of treatment in international dealings. It plans to enact tariff legislation giving equality to all nations, but carrying a power to discriminate by means of high import duties against those nations that discriminate against us.

Officials Object to Plan

Objections to this plan have been voiced by officials who maintain that the only course that is profitable and logical is one whereby this country will conclude individual treaties with the different nations and in which those commodities that the United States produces to the greatest quantities and is most desirous of exporting will be specifically arranged for.

The United States tariff act of 1890 provided for cer-

tain bargaining methods, but these were found undesirable. Hides and certain edibles were admitted free of duty, and the President was authorized to proclaim without further act of Congress special penalty duty on these products when they were imported from any country that imposed unequal or unreasonable duties on American products. This was penalizing, not a discrimination against the United States but rather a high levy on American goods, a levy higher than was regarded as fair, and the President was consequently given the power to place the goods of one nation on a less favorable basis in our markets than similar goods imported from other countries.

Penalty Provision in 1909 Tariff Act

In 1897 the tariff act included three bargaining provisions, all offering and seeking special concessions. One provision was similar to that of 1890, another authorized the President to make special reduction on certain commodities in return for reciprocal and equivalent concessions. The third provided that any such treaties would have to be approved by Congress before they became effective. Most of the treaties failed ratification in the Senate and therefore never took effect.

In the tariff act of 1909, and which terminated the provisions of the 1897 act, a penalty provision was included to remove discriminations against American interests in foreign markets. It was based on the principle that every country granting our products equal treatment with similar products of other countries was entitled to equal treatment in our markets. There was a maximum tariff and a minimum tariff, the maximum tariff including an additional 25 per cent ad valorem rate to the minimum tariff. The President was authorized to grant the minimum tariff to those countries which imposed no discriminations on American products and the maximum where there were discriminations. This tariff act was found somewhat sound in principle but not sufficiently flexible. Many of the countries continued their discriminations regardless of the imposition of the maximum tariff.

This act also included the ratification of Congress be-

fore the agreements with foreign nations could become effective. The U. S. Tariff Commission objects to this provision because it states that in the complex conditions of commercial bargaining no consecutive policy can be carried out by negotiating treaties or agreements here and there which, in each case, must be submitted to the Senate for ratification or to Congress for approval.

Again in 1916 Congress enacted a provision for retaliation against prohibitions of American imports into foreign countries, allowing the President to prohibit the importation into the United States of articles from any country that prohibits the importation of similar articles from the United States.

The U. S. Tariff Commission in its report recommended that the United States should ask for no special favors and should grant no special favors, but should exercise its powers and impose its penalties not for the purpose of securing discriminations in its favor but to prevent discriminations to its disadvantage, and recommended the enactment of legislation authorizing the imposition of additional or penalty duties at the discretion of the President against the countries not granting equal treatment to the United States.

This is the policy that meets with objection in many of the official quarters in Washington. It is pointed out, for example, that an automobile tariff act by England might specify certain weights, prices and power alike to all countries and yet be discriminatory against the United States because the cars with the highest duties applied to them might be those manufactured in this country. For instance, the United States exports chiefly low-priced, light-weight, lesser power cars to England. France manufactures higher priced, heavier and higher powered machines which she sells to England. If a tariff act specifies a particularly high duty against the lower priced, the lower power and lesser weight cars without mentioning any country, it would be a discrimination against the United States, but it would be equal

treatment to all countries literally and could not be denounced by this country.

It is because of this condition and similar conditions that there are opponents to the bargaining tariff plan who are in favor of concluding separate individual treaties with each country.

Again there are objections to the bargaining tariff which would discriminate against similar products imported from abroad when the foreign country discriminated against like products imported from this country. It is pointed out that the United States is the greatest manufacturer of automobiles. No other nation would be seriously harmed if we attached a high duty against automobiles imported into this country as a penalty to nations which placed a high duty on automobiles imported from the United States. The results could only be harmful to this country, as it would reduce the exports, while having no effect on the automobile imports, which form an insignificant amount.

The legislation favored by the tariff commission calls for an act in which Congress should define in general terms the kind and degree of unequal treatment which is to be penalized, which will enable the President to penalize not only upon discrimination, but also those discriminations more or less concealed in custom regulations, transportation rates, sanitary provisions, classification, etc. This legislation would eliminate the objection that now exists against penalties imposed on similar commodities.

The law should also name a variety of products selected with the view of inflicting a maximum penalty on foreign countries that discriminate against us and the minimum injury to the American consumer, and it should enumerate all the articles or commodities on which the penalty or maximum duties may be imposed and should specify the maximum limit of these duties. It should permit the President a free hand to administer the law within these limits in order to insure the necessary flexibility.

How Industry Can Aid

IF will be particularly profitable to American industry to take an active hand in the formulation of the new tariff laws which will be considered by the present Congress and which were suggested by the President in his message.

Congress comprises chiefly men thoroughly versed in law and less familiar with business. The Revenue Act is an excellent example of Congressional construction. It is now an act filled with conflicting and dubious phrases due solely to the lack of intimate knowledge of the details of each industry that would be necessary to insure a fool-proof and equitable law.

It was not possible for Congressmen to know, for example, of such details as the practice of dealers buying chassis and bodies separately and bolting them together. And it is not strange that no provision was made to prevent the double taxation that occurs with this transaction.

Similarly Congress does not know the intimate details of the automotive industry in its relation to a tariff, and whether we have a series of tariff treaties, a bargaining tariff or some other form, it is essential that industry should take an active part in drafting the bill.

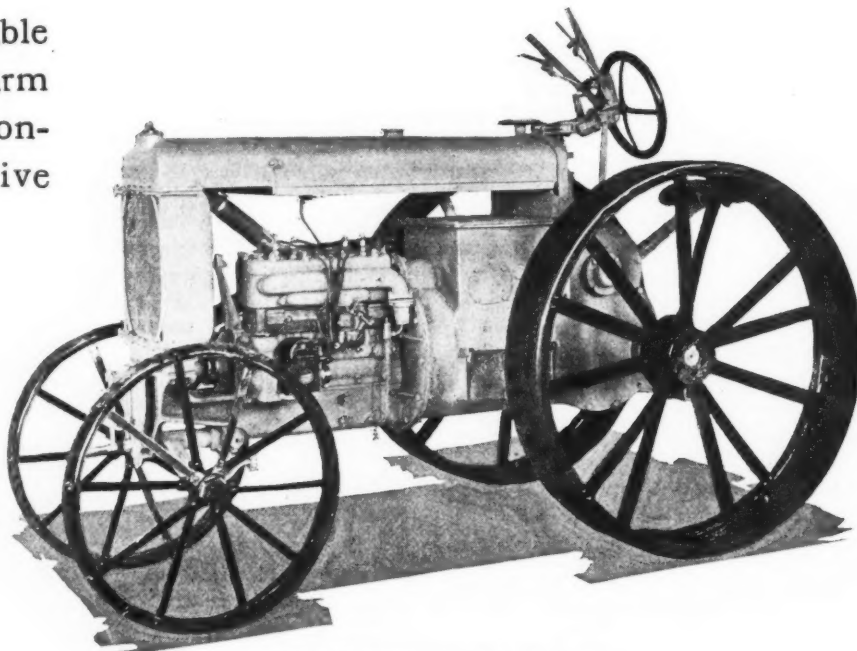
Our export trade, which has gathered such great momentum and now gives promise of huge development, can be ruined completely by the formulation of a law that lacks the fine points which business men only can add to it.

Kardell Utility Tractor

A 2-Plow Tractor Also Suitable for Cultivating and Other Farm Work—Backbone Frame Construction and Enclosed Drive

A LIGHT tractor with several up-to-date features is announced from St. Louis by the Kardell Tractor & Truck Co. In the words of the makers, the utility of the machine is not limited to plowing and other operations necessary in preparing the seed bed, but it serves equally well for handling any type of cultivator, mower, grain or corn binder, hay rake, manure spreader or wagon, and for belt work. The machine is of compact design, the four-cylinder engine and transmission, bolted together, spanning the distance between the front and rear axles, and the wheelbase is comparatively short. The engine is of the company's own make. It is a four-cylinder design, of 3¼-in. bore by 4¼-in. stroke, all four cylinders being cast in a block, with a detachable cylinder head. The crankcase is cast separately and is of the barrel type. It is cast at the rear end with a large flange, to which the transmission is bolted, and at the front with a heavy bracket swiveled on the front axle.

As regards fuel, the makers say that either gasoline or kerosene can be used. The fuel tank, which forms the cover over the engine, is of heavy gage sheet metal, and is of ample capacity. A Bennett carbureter is used, and all air is

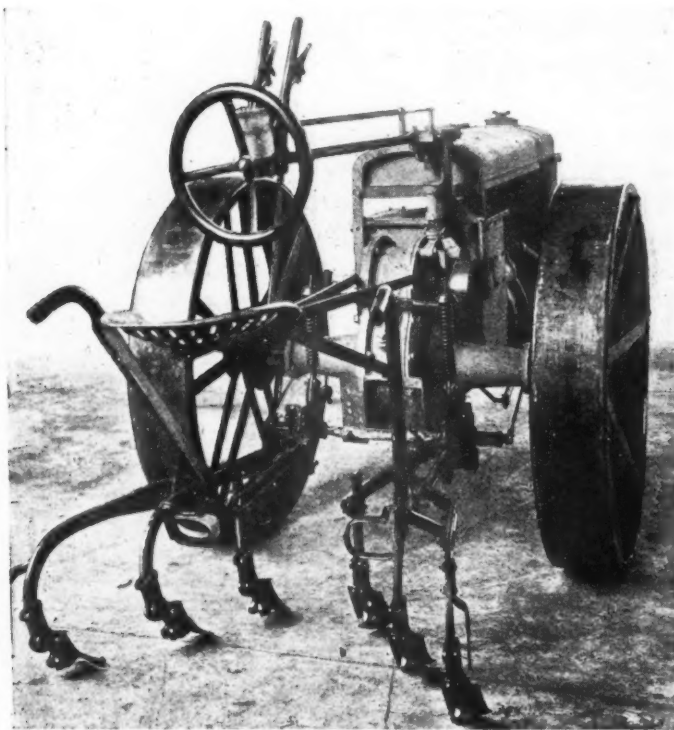


Kardell Utility two-plow tractor

drawn in through a Bennett air cleaner. Ignition is by a Dixie high-tension magneto with impulse starter. Lubrication of the engine main bearings is by force feed, but all other bearings are lubricated by splash. The plunger-type oil-circulating pump is clearly shown in the side view of the tractor. All gears are fully enclosed in a dustproof case and run in oil. Circulation of the cooling water is effected by gravity. The honeycomb radiator has cast-iron top and bottom tanks and side spacers. The latter are strong enough to afford ample protection to the radiator core. The total water capacity of the cooling system is 10 gal. It will be noticed that the belt-driven fan behind the radiator is enclosed by a shroud.

Transmission Design Unconventional

The arrangement of the transmission is out of the ordinary. There are two parallel shafts back of the engine, a primary shaft in line with the engine crankshaft and bolted to it and a secondary shaft vertically above the former. The primary shaft is of the splined type and carries three gear pinions of ample face width upon it. Two of these pinions, for the first and second forward speeds respectively, can be slid along the shaft by means of a suitable sliding arm. The secondary shaft carries three large diameter spur gears, for the first and second forward speeds and the reverse speed respectively, the two forward speed gears being combined in one. All these gears are free upon the shaft, but can be secured thereon by plate clutches of the Kardell company's own design, one clutch serving for the two forward speeds and the other for the reverse. Thus, there are two independent friction clutches, one for forward operation and one for reverse, and as these are not located inside the flywheel the gear case is somewhat more bulky than is usual. Naturally, as the clutches operate at a much lower speed than if they were carried on the primary shaft, they have to be of considerable size. The speeds of the tractor are given by the company as 1½-2½ m.p.h. on low gear and 3-6 m.p.h. on high gear. This points to the fact that no governor is used, and the speed can be controlled by the throttle to quite an extent. From the secondary shaft of the transmission the drive is through a bevel pinion and bevel gear to an intermediate shaft on top of the rear axle, and thence by spur



Rear view of Kardell tractor, with cultivator attached. Note seat and control extension used

gear to the differential gear on the rear axle. All gears are completely enclosed and run in oil. Anti-friction bearings are used throughout the drive.

A belt pulley is provided; it is not visible in the illustrations. It is located at the forward end of the tractor, parallel with the wheels, and any belt slack can therefore be quickly taken up. The pulley has a diameter of 9 in. and a width of face of 5 in.; at normal engine speed it turns at 1000 r.p.m., giving a belt speed of 2300 ft. per minute.

The rear axle is of the live type, and carries the differential gear at the center. The central portion of the axle housing is cast integral with the transmission housing, and over the large openings in this central portion are secured horn-shaped housings of cast steel, which surround the axle shafts. Gurney ball and Hyatt roller bearings are used in the rear axle and Timken roller bearings in the front wheels.

Driving Wheels of Latest Tractor Design

The driving wheels are 48 in. in diameter by 8 in. width of face, and are equipped with quick-detachable lugs. These wheels are of the latest tractor design, with flanged rolled-steel rims, flanged cast hubs, and flat spokes which are riveted to both hub and rim. The front wheels are 36 in. in diameter and are provided with skid bands. Steering is by means of a hand wheel on a rearwardly extending shaft which carries a bevel pinion meshing with a larger bevel gear on a vertical shaft. The steering gear is so arranged that the tractor can be operated from the implement. Directly in front of the steering wheel there is a double sector on which the clutch and change-gear levers are mounted. A band brake is fitted to a drum on the shaft of the spur pinion, outside the transmission housing.

The hitch of the Kardell tractor is located 7 in. below the center of the draft line, which is claimed to obviate all tendency of the tractor to "rear." The I-section front axle is so mounted as to allow a free movement of oscillation, thus permitting the tractor to accommodate itself to any unevenness of the ground surface, and of running the wheels on

one side of the tractor in the furrow without subjecting the tractor to any additional strain. The front end of the engine crankcase forms a support for the front axle and radiator, starting crank and belt pulley. The spring support of the front end is shown in the longitudinal sectional view, and although the spring used is of the coiled type there is no sliding motion corresponding in extent to the spring play, the part on which the spring rests having a pivot support on the bottom of the crankcase, and having only a slight rocking motion.

The total length of the Kardell Utility tractor is 98 in., and its width 56 in., but the driving wheels can be reversed on the axle and thus the width reduced to 40 in. when desired. The height of the tractor is 52 in. and the weight approximately 2200 lb.

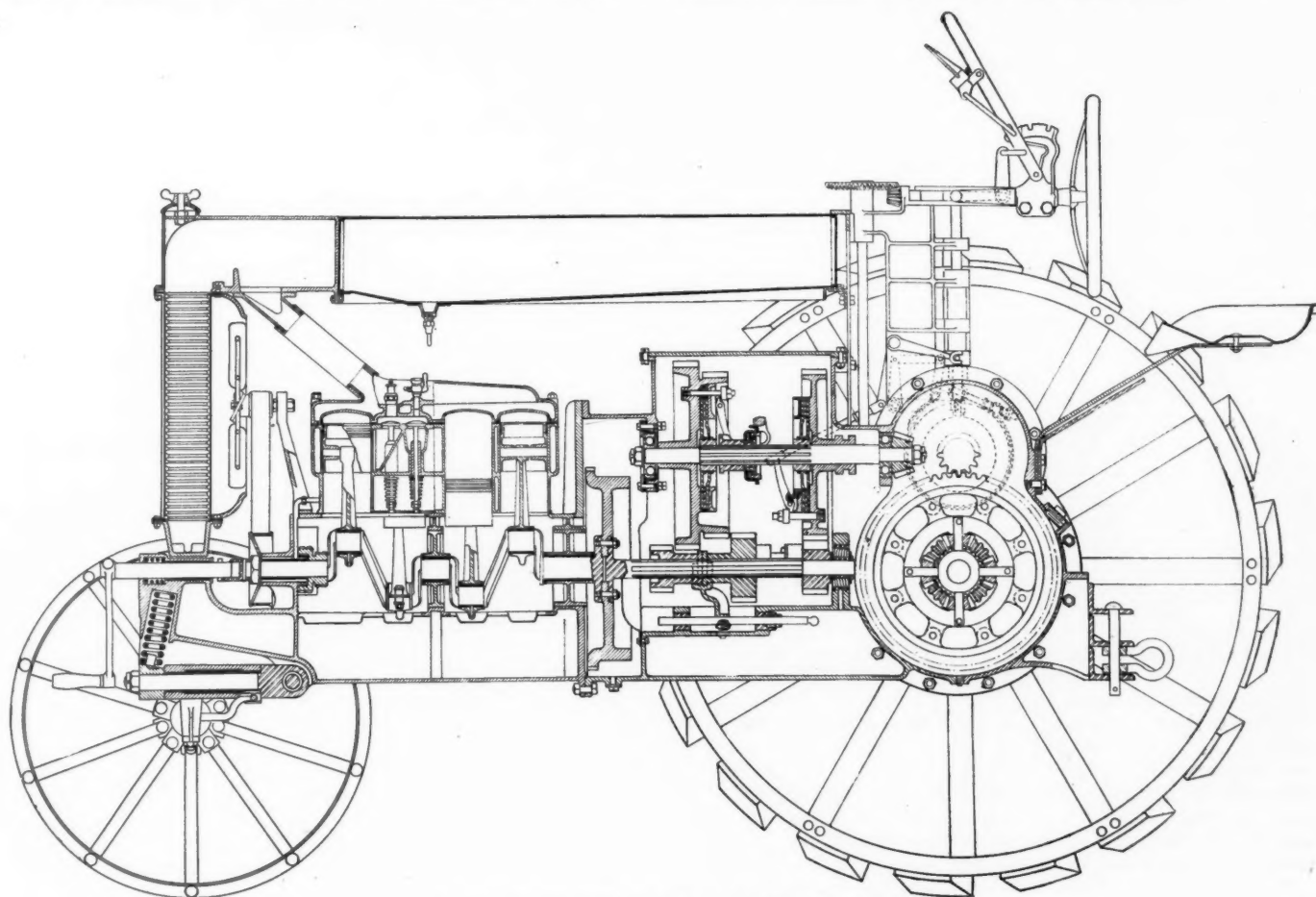
The tractor is rated at 8-16 hp., and is recommended for pulling two 14-in. plows. Provisions are made on the engine for installing an electric generator for night illumination and also for mounting an electric starter.

There is a dash secured to the rear end of the transmission housing, and the fuel tank extends between this dash and the overhanging top water tank of the radiator.

Anti-Friction Bearings in Grain Binders

An important advance in the construction of grain binders has just been made by the Moline Plow Co., Moline, Ill., which has adopted the use of Hyatt roller bearings in its binders.

One enthusiastic writer compares this step to the invention of the Marsh harvester in 1864 and the development of the Appleton knotter in 1880. Not less than 37 of these anti-friction bearings are used on the Moline, and among the advantages gained are that the friction is reduced, the need for the daily oiling of numerous bearings obviated, and the binder is suited for operation at tractor speeds, which are considerably higher than horse speeds.



Longitudinal sectional view of Kardell tractor

Benzol Production at Gas Works

Steps Being Taken by British Benzol Producers to Insure General Distribution of the Fuel—Description of a Small Rectification Plant

PREVIOUS to the war benzol was used as a motor fuel only, in France and Germany, but in recent years much interest has been aroused in its possibilities in Great Britain and some even in the United States. Great Britain is interested chiefly because of her keen desire to find a suitable home-produced fuel. It is only natural that most of the pioneer work in connection with new fuels should be done abroad, because the United States is the greatest petroleum producing country in the world and the price of gasoline has always been materially lower here than in the principal European countries. However, we have recently had our attention focused on the fact that our unmined supply of petroleum is rapidly dwindling, and as this is brought home to the consuming public and to the industries which are mainly dependent upon a volatile liquid fuel interest in substitute fuels will grow rapidly.

Most people having anything to do with automobiles know that benzol is a by-product of the coking of coal in gas works or coke oven establishments, but few know anything of the details of the process nor of the quantities in which the fuel may be recovered. Some light is thrown on these subjects by a recent article in *The Engineer*.

The Problem of Distribution

"The sudden termination of hostilities found British gasworks and coke-oven undertakings wholly unprepared with a post-war policy as to the marketing of their benzol. Now that the producers are faced with the problem they find that the distribution of several million gallons per annum is by no means a simple problem, in spite of the demands for the fuel. Two distinct lines of action have been proposed, namely, to turn the whole output over to the gasoline interests and to make use of their highly organized distributing machinery, or to set up the necessary organization for an entirely separate scheme of distribution.

"At the present time, of course, many of the large coke-oven undertakings place their benzol at the disposal of motorists, but they are only prepared to supply in 50-gal. drums—an arrangement not altogether alluring to any but the large consumer, when it is borne in mind that coke-oven works are all segregated in the northern districts, and that special railway rates have to be paid on the spirit. The whole problem is now being tackled by the Benzol Producers' Association, a small committee of which, representative of the gas and coke industries, is considering such questions as specifications for quality, etc. It is understood, too, that the gasoline purveyors have been approached as to use being made of their existing facilities for distribution, and that the benzol producers consider a charge of approximately 2d. per gallon as appropriate for the concession. From what can be gathered, however, it is believed that the negotiations have fallen through owing to the petrol purveyors demanding more than twice that sum.

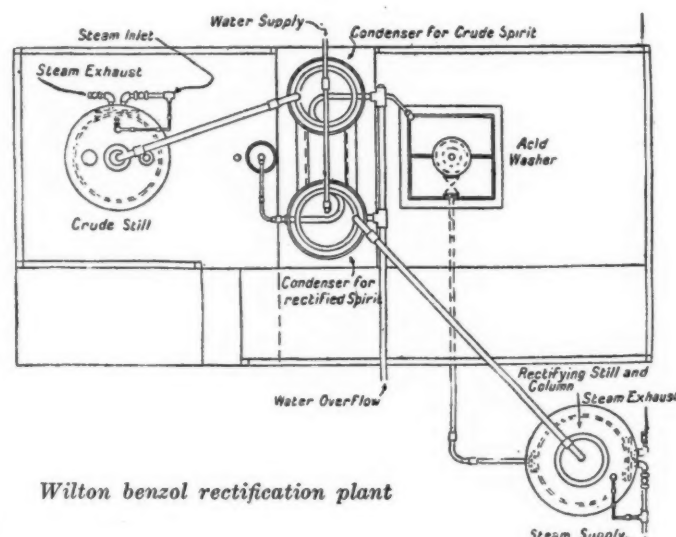
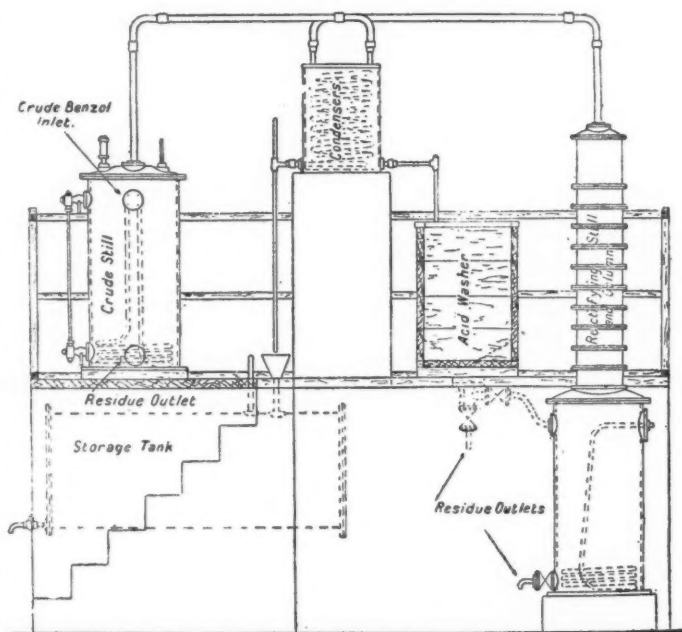
"It has often been argued that, owing to the ubiquity of gasworks, there should be no difficulty in arranging for innumerable depots for supply in all parts of the country, but while that is true in a sense, it must be remembered that it is exceptional for gasworks to take the process any further than the recovery of the crude spirit, which would be most undesirable as a fuel. This crude spirit is accordingly dispatched to the isolated centers at which plants for purification and rectification are found. Thus the double handling and transport have proved a costly item.

"In the past it has not been considered a commercial proposition for any but the largest gasworks to put down rectifica-

tion plant, but the demand for a simple process of the kind has now led to the introduction of apparatus which can, without doubt, be profitably installed at all those gasworks employing 8000 tons of coal per annum and upwards. There are approximately three hundred works in England alone—exclusive of Wales and Scotland—which would fall within the limits named. As a supplement to these stations, there would be the coke-ovens in the North, and some provision could probably be made for increasing the poorer resources of the southern districts from them.

Every Gasworks a Depot

"Already a number of the miniature rectification plants, suitable for the small producers of the crude spirit, have been put on order. A plant of the kind, operated on the Wilton



Wilton benzol rectification plant

principle, is shown in the accompanying illustration. This plant appears to possess the merit of combining simplicity with moderate capital outlay. The crude benzol, recovered in the ordinary manner by means of the comparatively simple process of oil-washing, is, in the first instance, run into a crude still which merely consists of a small boiler to which is attached a simple column. Distillation is effected by means of steam coils, and the light products are distilled off, passing through a water-cooled condenser of ordinary construction from which, in the liquid state, they gravitate to the washer.

"In the larger motor spirit plants it is usual to arrange for secondary distillation, that is to say, the 'once-run' spirit is collected in a separate storage tank, and subjected to further distillation in the secondary still prior to undergoing the washing process. This secondary distillation, however, may be eliminated if the precaution be taken to work up the original crude spirit to a strength of from 70 to 80 per cent at 120 deg. Cent.

"One of the contingent advantages attached to the process of recovering crude benzol is the freedom gained from naphthalene troubles. The wash-oil with which the coal gas is treated, if of the correct composition, not only removes the light-boiling hydrocarbons, but the greater proportion of the naphthalene as well. Thus, benzol recovery offers a further very substantial inducement. It is for this reason

that the residue which remains in the crude still of the motor-spirit plant consists of creosote oil highly charged with naphthalene. The economics of the process are such, however, that no product need now be regarded as waste, so that the creosote oil may be separated and sold as a by-product, while the naphthalene may also be refined, when it will command a good price. The creosote, of course, is derived from the original wash-oil employed, a small proportion of which invariably comes over with the crude spirit during primary distillation.

"As regards the light products obtained from the still of the motor-spirit plant, they contain such impurities as tar acids, tar bases, and sulphur compounds, which, of course, must be removed. For this purpose the distillate is treated with sulphuric acid and caustic soda. In the larger rectification plants agitation during washing is carried out by mechanical means, but, with the plant for the small gasworks, hand agitation is arranged for in order to avoid every possible complication. After the purification treatment the distillates are run by gravitation to the final rectification still, which consists of a dephlegmating column standing on a boiler. The contents of this final still are distilled off by means of steam, the distillates—representing the finished motor spirit—passing away through a water-cooled condenser, and thence to the underground storage tank."

Cammen Carsafe Load Governor

A SAFETY device which makes it impossible to start a motor truck when it is overloaded has been developed by the Cammen Laboratories, 42 West Thirty-ninth Street, New York. It consists of two parts, a registering device (Fig. 1) and a control device (Fig. 2). The registering device takes the place of the usual spring shackle and is a casting which has to be designed specially for each make of truck. The upper part, A, of the registering device is attached to the chassis and the lower part, B,

carries the spring bolt, the two parts being hinged together at the right in Fig. 1. Part A carries an oil reservoir on which pressure is exerted by a plunger through a welded-in bronze diaphragm. This pressure is transmitted to the Bourdon tube in gage C.

The gage C is equipped with a circuit closing device so located that it is reached by the pointer when the load on the truck exceeds a safe limit. Let us say that the manufacturer or user desires to have a useful load of not more than 2000 lb. This, for a given truck, means that the load on each side of the rear axle should not exceed, say, 1600 lb. The circuit closing pin is then set at 200 lb., which is the load registered through the hydraulic transmission by the gage when the load on the truck is 1600 lb. for each side of the rear axle. It is generally sufficient to equip one side of the rear axle with a governor, the load being usually evenly distributed on the truck.

When the load exceeds the safe limit the pointer of the gage reaches the circuit pin D and thereby closes an electric circuit. This energizes an electromagnet (Fig. 2) and the latter then attracts its armature. This in its turn withdraws the catch, E, and permits the spring to pull over the bell crank, F, thereby opening the ignition circuit so that the engine cannot be run.

At the same time, however, the swinging out of the bell crank draws away the metal plate, G, against which press contact brushes, which opens the circuit around the electromagnet. In this way both the ignition circuit and the control circuit are automatically opened. The advantage of this is that the electromagnet may be made to carry quite a heavy current without exhausting the battery.

When the spring draws back the bell crank the latter strikes a bell (not shown in the drawing), which notifies the driver that the truck is overloaded.

Once the ignition circuit has been opened it will stay open until closed again by the driver. To do this the driver has to pull the rod, H, as far as it will go.

To prevent drivers from tampering with the governor the pull rod, H, which closes the ignition circuit, is made interlocking with the ignition switch. A slot is provided in the rod and the ignition circuit can be closed only when the switch feeds into this slot; but when the rod is in such a position that the ignition switch does feed into the slot, the cable, I, is quite loose and the bell crank cannot be held manually against the tension of the spring, which would be the only way to hold it if the truck was overloaded and the circuit through the electromagnet closed.

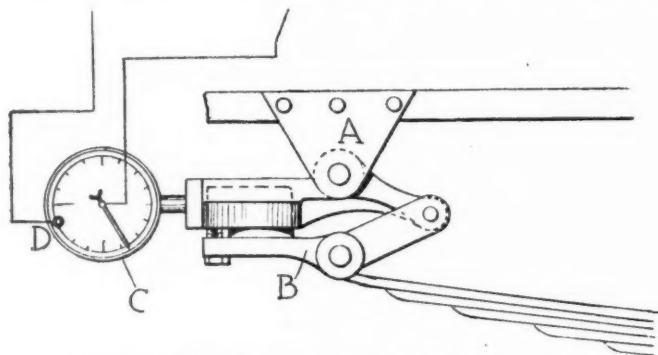


Fig. 1—Outline drawing of Cammen Carsafe.

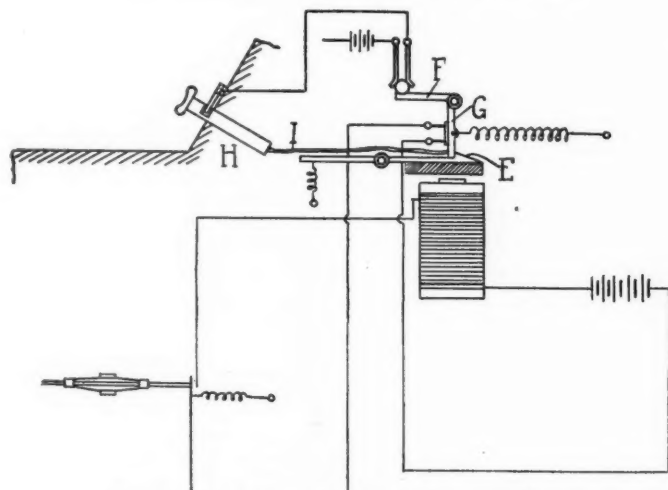
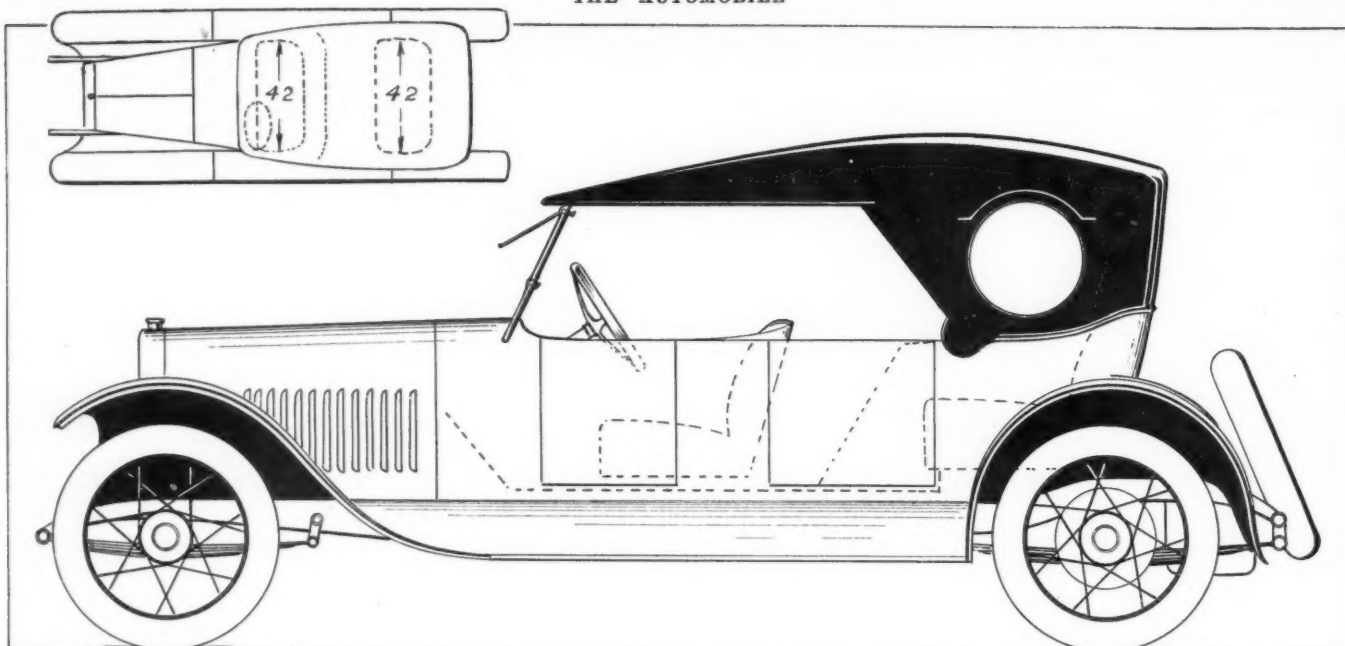


Fig. 2—Diagram of electrical connections.



Close-coupled touring body with top having Victoria lines and windshield extension

A New Design Touring Body Top

Built on Lines of Victoria, with Windshield Extension and Drop Curtains
Entirely Enclosing Rear Seat

By George J. Mercer

NUMERICALLY, the touring body is still the most favored of the body designs, although it has been predicted that it would be succeeded eventually by some type of closed body, because the occupants of the rear seat of open cars are subjected to the discomforts of dust when touring. But the touring body still holds its own and there have been many additions to make it suitable for all-year use, such as demountable and convertible tops as well as several forms of touring tops that have either a window or curtain arrangement that serves very well in keeping out the wind and rain.

The most popular type of touring body to-day is the close-coupled for four or five passengers. The chief advantage of this body type is that the rear seat is well forward of the axle, permitting a better arrangement for the comfort of the rear passengers. For example, with no auxiliary seats to be accounted for, a second windshield can be designed and fitted with an assurance that it can be made to work, because adequate space is available for operation.

Windshield with Drop Curtain

The design illustrated is an entirely new design of top that can be used with any close-coupled touring body. While it would be possible to make it demountable, far better results will be obtained if it is made permanent with the body at the time of construction. As it is intended to have the side windows drop down full length, pockets must be provided for them and the top must be well braced. A permanent ironed job is better than a take-on-and-off design.

This top has the lines of the well-known Victoria with the addition of an extension to the windshield.

The design illustrated does not fold down, therefore no side braces with joints are needed and the windows can be made much larger. The rear lights are stationary.

The novel feature about this top is the windshield that with the aid of a drop curtain entirely closes in the rear seat. In Fig. 2 the shield and attached curtains are shown in position entirely closing up the front of the top. This glass is 21 in. long by 44 in. wide, and when in position has the same slant as the front line of the top. At the top are two spring pins that rest on the guide plates, on each of which there are two depressions. The pins rest in these depressions when in the two positions illustrated by dotted lines. In explaining this, we will start from shield position No. 1, which is also shown on the section. Position No. 2 is reached by releasing the shield from its fastening at the bottom and pushing it over as indicated by the arrows until the bottom is in line with the pocket into which it will eventually drop. In making this swing the shield is supported by the pins at the top which rest in the rear depressions in the guide plates.

When the shield is in this position, No. 2, a lip or plate on each side of the pocket is thrown up by revolving a knob, preventing the shield from swinging back again to the perpendicular. The shield is now resting loosely in the pocket opening. In order to provide room for getting in or out, the top of the shield is pushed along the guide plate until the pins engage in the depressions at the forward end of the plate. This brings the shield into the perpendicular position, No. 3. The shield may be used in any one of these positions. When not in use, it is first moved back to No. 2 position, and the pins drawn out of the depres-

sion in the plate by compressing the springs by means of the knobs on the frame for this purpose. The shield is then lowered into the pocket, position No. 4, where it is safely stored away and is flush with the top edge of the body.

When the shield is in use as in position No. 1, the rest of the space down to the floor is taken care of with a curtain, fastened to the back side of the shield with buttons and kept away from the knees by being fastened to each door, so that it has a tent shape that will be more comfortable. Above the shield the space is similarly enclosed by a short curtain fastened permanently to the top, and to the upper edge of the shield in the same manner as the lower curtain. This upper curtain is detached when the shield is dropped into the pocket.

This shield actually makes a combination body that is a novelty. In position Nos. 2 and 3 protection is assured from stormy winds and in position No. 1, with the drop curtain in place, the interior at the rear is virtually a closed body. When it is desired to put the shield away, it is dropped into the pocket at the rear of the front seat and carried with the minimum of strain on the body because the weight is low. It is out of sight and always ready for instant use.

There are similar top and combination shields used on the Pacific Coast, and are called California Tops. In all cases, however, they are an adaptation of the Demi-Limousine type and the shield is either slid up to the top and held there when not in use, or is parted in the center and turned inward toward the side when open for entrance or egress. Carrying the shield in the roof is very objectionable, as the additional weight is liable to weaken the top supports.

Wood and Aluminum Frame

The frame work of the top is of wood and quite stout. The round corners of the rear and the top are best formed of aluminum sheet and the imitation leather stretched over. A metal foundation of the rounded surfaces will insure a permanent shape and add to the durability of the goods, as all action set up by straining will be obviated. A drip molding is used on the sides to guide off the water from the top and a cod piece similar to that used on a real Victoria is formed at the base to add to the appearance. The top is lined on the under side, and as it will get a deal of dust, a tan or tan and gray shade of cloth will be best suited for wear, and slip cover should be used over all, or if unlined either painted wood finish or cane work are equally adaptable.

The side glass can be much larger and of different shape if desired, but that will be a matter of individual taste; as to the color of the top, any shade can be had and any one will give service provided the quality is there. Imitation leather for ordinary work and real leather for high class would be a sensible specification.

This design should be very acceptable to that considerable class of car users in the large cities that have favored Victoria tops both in season and out. It has enough of the Victoria to be of the same family, and in addition it possesses distinctive features that make it well adapted for town car use. The several positions on which the shield can be used will accommodate all kinds of weather, and in particular, will the closed-in position be a distinct adjunct.

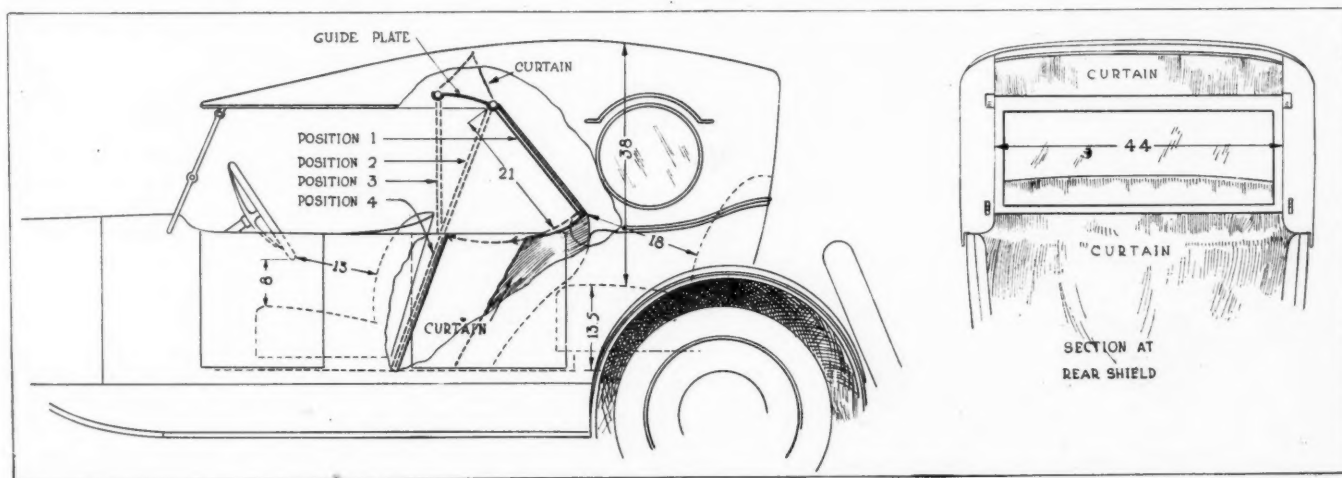
Should Appeal to Users of Victoria Top

The turning of a body of this type will be more elaborate than with the ordinary touring body. There should be a speaking tube or phone for communicating between the seats when the rear is closed. This can be easily carried on the roof. The trimmings can be a combination cloth and leather, the latter being entirely used for the driving seat.

The body design is similar to the accepted type seen at the recent shows. The seats are ample for comfort. The rear cushion is higher from the floor than the front, making it easier for a stout person to rise to a standing position than if the seat were low, and ample leg room is provided for all occasions. The extra tire is at the rear, where the weight is needed on most cars, especially when no passengers are carried on the back seat.

The dimensions of the body side light as well as size of doors, etc., are omitted in the drawings, but can be easily ascertained by measuring. One of the top dimensions, it is well to call attention to, is the distance between the lower edge of the shield and the turning of the back. This is 18 in. and is a very generous distance so as to remove any use of being packed in, when the shield is in position No. 1.

ACCORDING to the *American Gas Engineering Journal*, Atoluol being no longer used in large quantities for T. N. T., stocks are rapidly accumulating. A brisk demand for both benzol and toluol is predicted as a result of the establishment of the dyestuffs industry in this country. But there is no need to wait for that. Benzol, toluol, and solvent naphtha, now a drug in the market, can be sold mixed for motor-fuel. For that use it is worth 20 per cent more than gasoline.



Windshield and attached curtains entirely close front of top when in position

Continental Plant Layout Facilitates Production—II

Engine Shipments Go Out on Same Tracks on Which Raw Parts Enter—True Progressive System Used

By J. Edward Schipper

ANOTHER important semi-automatic, compound machine in the piston department at the Continental plant is that which turns the pistons and grooves them. This machine is capable of turning and grooving 100 pistons per hour. The turning tool first descends, roughly turning the pistons to size. After this has done its work in a vertical direction, the groove cutters move over against the piston and cut the grooves to the proper depth. As soon as this depth has been reached the machine cuts off automatically. The pistons then pass on to be finish-turned and finish-grooved, ground and drilled for set screws, etc., finally entering the assembly department.

A machine in the connecting rod department which is of particular interest is that for drilling the holes for the connecting rod bolts in the crankshaft end of the rods. This machine, illustrated in Fig. 10, has ten spindles and a square table. The fixture accommodates eight rods at one time, six rods being actually machined at once, while the remaining two are being set up by the operator. The machine is capable of handling fifty-eight rods per hour. By the use of this machine, with the operator continually setting up two while the other op-

erations are taking place, one man is able to handle this work on a single machine.

The oil pans and other deep drawn parts are made in the Continental factory, there being a special department for this purpose, where large presses are used. These

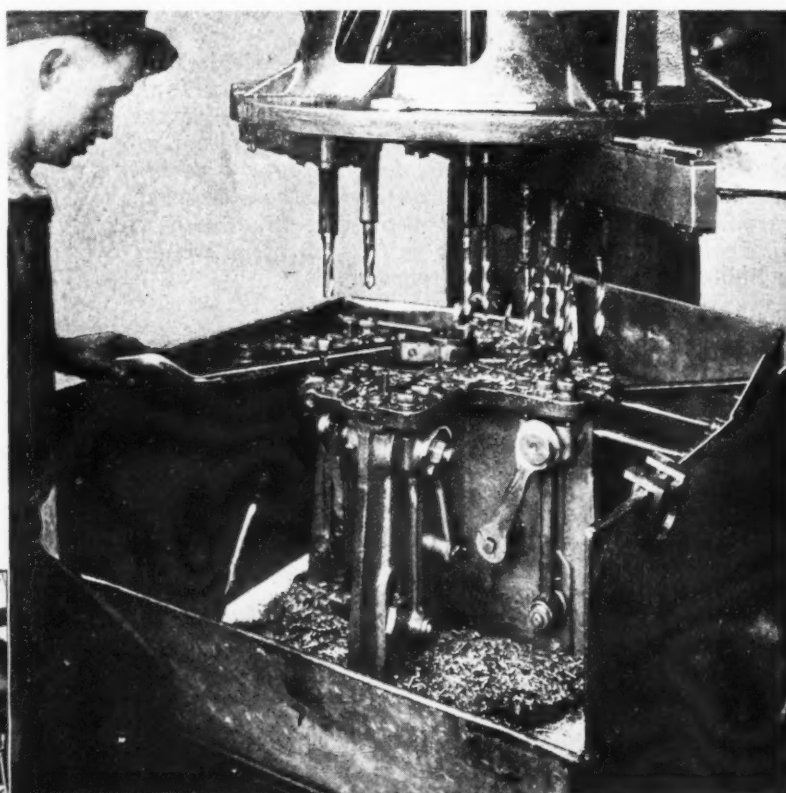


Fig. 10 — Fixture for drilling holes for connecting-rod bolts in crankshaft end of connecting-rods. This fixture accommodates eight rods at one time. Six rods are machined at once

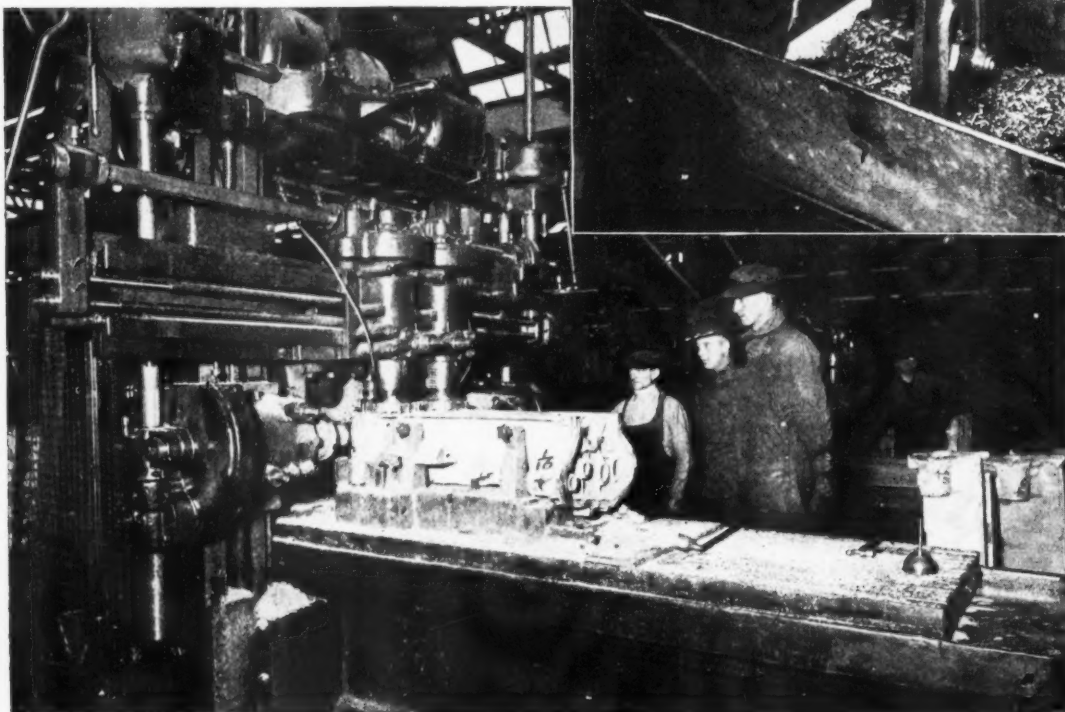


Fig. 11—Machining operation on aluminum crankcase. Six surfaces are being machined at one time

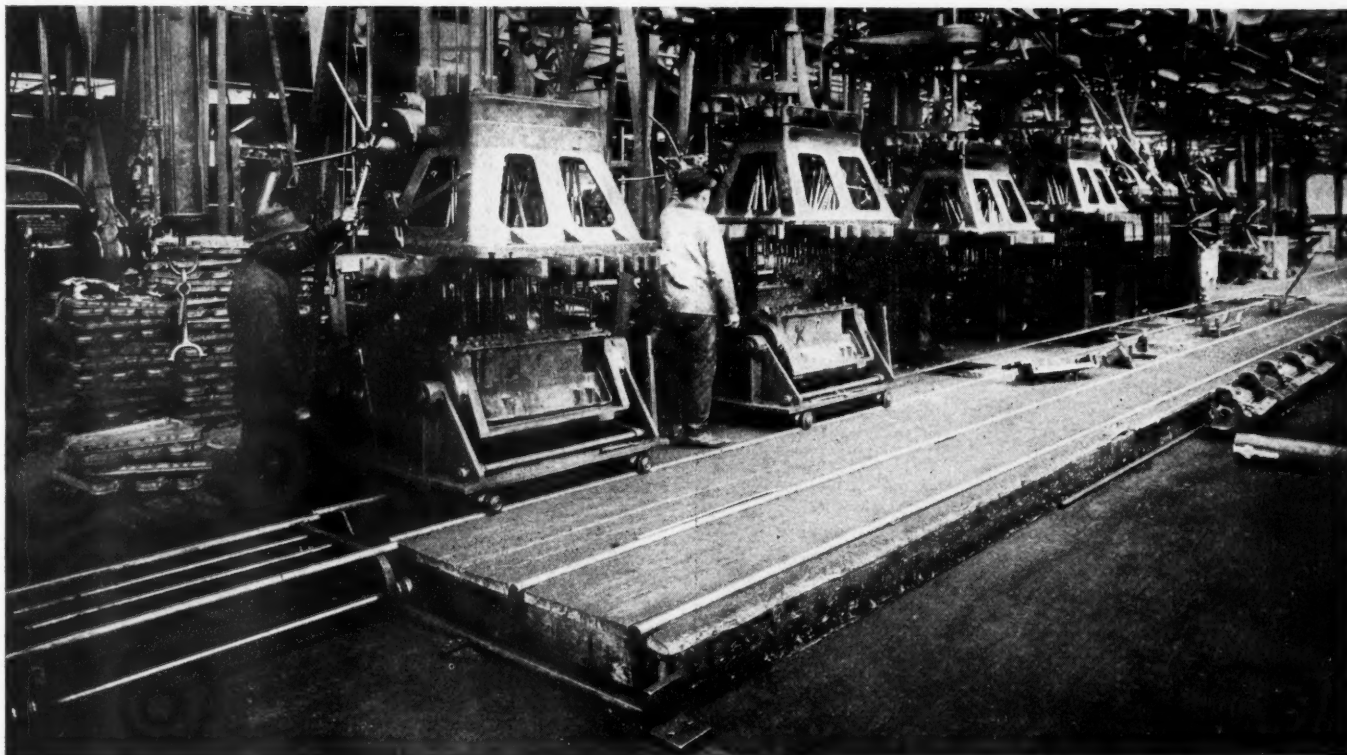


Fig. 12—Railroad fixture for drilling and reaming holes in cylinder block for valve stem and push rod guides. This set-up also takes care of valve seats and all holes and machine work related to the valve mechanism

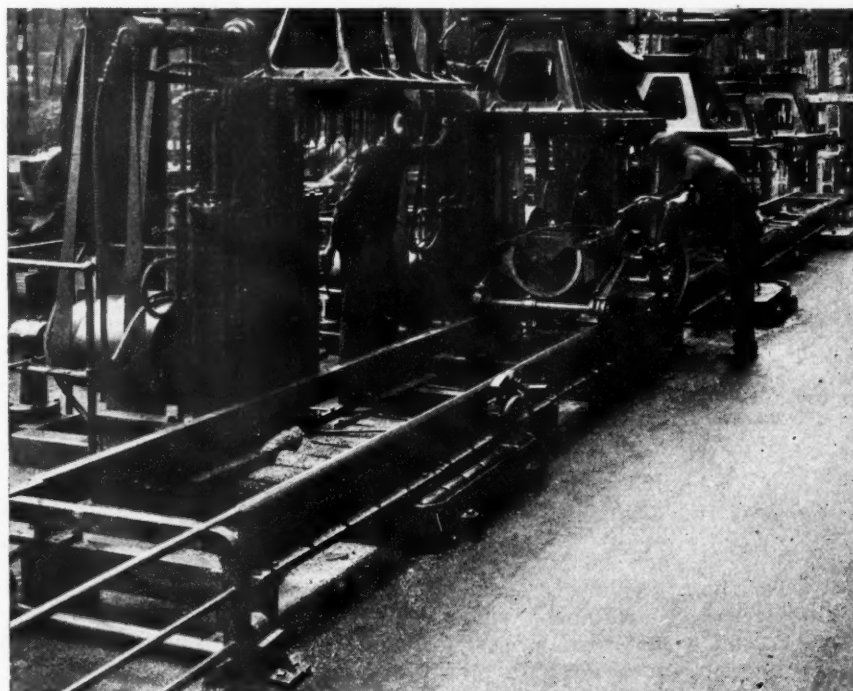


Fig. 13—Railroad fixture which drills all holes in aluminum crankcase. This fixture is operated by two men and requires approximately 3 min. for drilling all the holes

machines are the product of the E. W. Bliss Co. of Brooklyn, N. Y., and are capable of handling the deep drawing necessary for the oil pans in one operation.

In the crankcase departments a great variety of machinery and operations are necessary due to the six different models which are passing through. Some of the models have aluminum cases, and in one particular

model, the Continental 7 W, the top part of the case is in unit with the cylinder casting. On the aluminum cases the greatest number of operations are performed, these being for the larger and more complex models. The milling machines for the aluminum case, shown in Fig. 11, are milling six surfaces at the same time. This is a long table machine and is the true starting point in manufacture on this case. The machine is capable of handling nine cases per hour. A high-speed miller is used for milling off the face of the crankcase to which the cylinders are bolted.

The drilling, reaming and tapping work on the aluminum cases is handled on a railroad-type drill with a single jig traveling along a rail. This railroad is a single-track type in which the jigs work along in one direction and is then rolled back. This railroad outfit is shown in Fig. 13. There are five sets of spindles to take care of the major part of the operations of this nature on the case.

A more complete type of railroad drill is used in connection with the cylinder manufacturing operations. This is shown in Fig. 12. It is a double track railway with a cross-over at each end, so that the carriers for the jigs can be moved back on the outside rail. There are eight operations on these jigs, and it takes a cylinder block of the type shown in the illustration about 20 min. to go the length of the railway. Four cylinder blocks are usually in process at a time. These spindles take care of practically all of the drilling, tapping, reaming and similar operations on the block, and the jigs are so arranged that

moved back on the outside rail. There are eight operations on these jigs, and it takes a cylinder block of the type shown in the illustration about 20 min. to go the length of the railway. Four cylinder blocks are usually in process at a time. These spindles take care of practically all of the drilling, tapping, reaming and similar operations on the block, and the jigs are so arranged that



Fig. 14—Boring six cylinders at one operation



Fig. 15—One of the three water tests given each cylinder block. The first test is on the rough casting; second, after the cylinders are bored; third, after the cylinders are ground

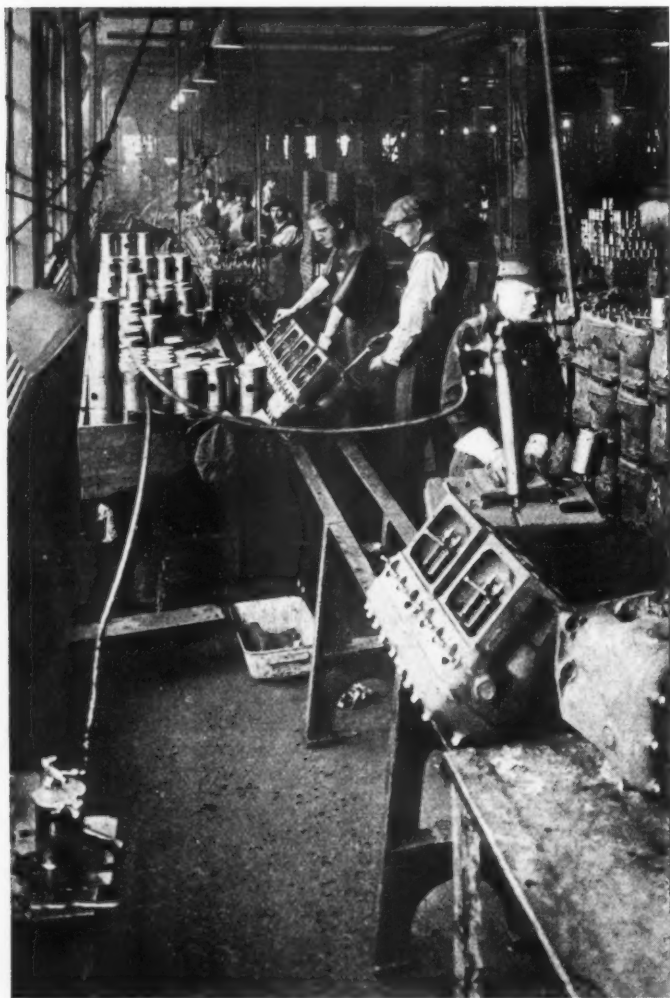


Fig. 16—Assembly department, showing racks tilted to the proper angle for fitting pistons to cylinders.

they can be turned over in the carriers to accommodate the block to the required position for the different operations.

In cylinder boring, all six are bored at the same time, this operation bringing the cylinders within 0.002 in. of the finish bore and preparing them for grinding. The boring machine, operating on six cylinders at the same time, is shown in Fig. 14. It takes about 30 min. to handle one six-cylinder block.

All of the manufactured parts go to the finished stockroom before they are started to the assembly line. This stockroom is on the opposite side of the manufacturing department from the raw stock, from which manufacture started. From here the parts are drawn at the proper point along the assembly line.

Assembly starts with the crankcase working along one line and the cylinder along the parallel one, the first operation being the passing of the castings through Blakeslee washing machines, where they are cleaned in hot alkaline solution. They are then air cleaned and the standard assembly operations started. The assembly starts along the back end of the building, and, as shown by the map herewith, works its way around three sides until it returns to the assembly and shipping departments, as shown on the diagram.

As the engine cylinder block progresses, the valve guides are pressed in and a set of piston rings selected so as to have a gap of 0.002 to 0.004 in. at the bottom and from 0.004 to 0.006 in. at the top. The cylinder head water jackets are given a water test, as illustrated in Fig. 15, so that leakage due to sand holes or other defects in the castings will be determined before the engine has passed along the assembly line. The gage in the illustration shows about 90 lb. pressure.

Along the assembly line the racks are all so arranged that the engine is at a convenient angle for the operator. Referring to Fig. 16, a sort of groove support is used



Fig. 17—Entrance to drying oven at Continental plant. Cylinders are fed through this oven on endless chain, the drying process being completed by the time the cylinder reaches the opposite side of the oven

for the blocks so that the operator can readily use his eyes in selecting the pistons, etc. Further along, the blocks will seem to be vertically upright where the operations are such as to require or make it advantageous to use the vertical support. The pistons are arranged in bins in the assembly department and are segregated in groups according to weights, so that all pistons which go into one engine weigh approximately the same. These groups of pistons are shown in the background of Fig. 16. The valves are ground with a carborundum compound,

after which the seats are cleaned with kerosene and the valves, caps, springs, etc., put in place. After the heads are put on, the cylinder blocks are painted, then passed through a gas drying oven, as shown in Fig. 17. The cylinders are fed to the drying oven on an endless chain, so timed that the drying process is complete by the time the cylinder reaches the opposite side of the oven. The smaller pieces have the paint sprayed on them in booths.

Final Assembly

After the painting has been completed the cylinder blocks move along to join the crankcase, upon which assembly has also been proceeding at the same time. When these parts are joined there is an overhead conveyor which carries the practically assembled engine over to the second side of the building, along which it moves on its way to the testing department. Here the final work is done on the assembly, the camshafts, manifolds, oil pans, etc., being put on, after which the tappets are adjusted, the timing gear cases fitted and all the minor accessories put in place, until the engine is complete and ready to be belted in.

Engines in practically completed state are shown in Fig. 18. These are just receiving their final assembly touches and are on their way to the testing department. The engines are run under outside power for 3 hr. at a speed of 150 r.p.m. They are then picked up by an overhead crane and set down on one of the testing blocks. Here they are run for 3 hr. under their own power, after which they are taken down and inspected and moved to a set of final test blocks for at least 2 hr. or until they have passed the final inspector's rigid test, at an average speed of about 900 r.p.m. The final testing room is shown in Fig. 19.

When they have satisfactorily passed their final test they are picked up and taken to the shipping department or are placed on the traveling chain, or endless belt shown at the right of Fig. 19. This carries them to the shipping room, seen in the rear in Fig. 23, and which is shown in a closer view in Fig. 20. Thus there are three

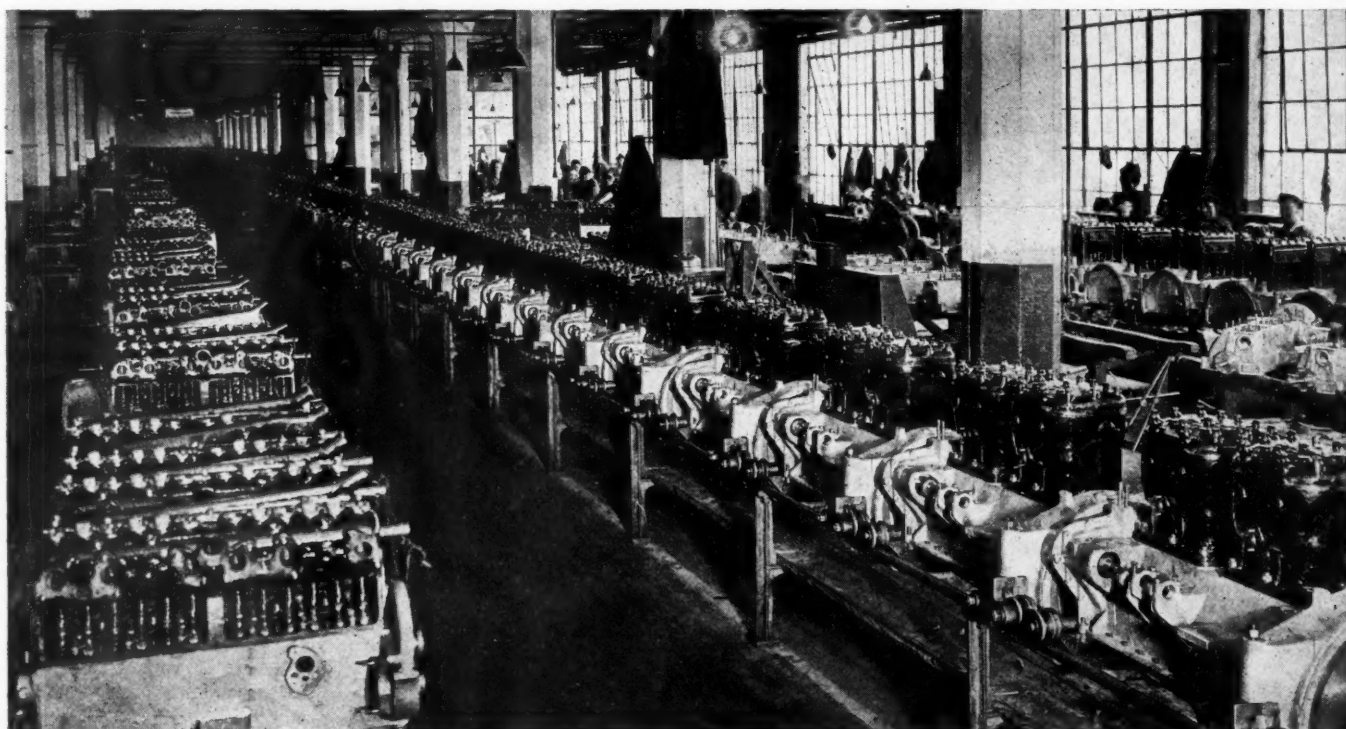


Fig. 18—Partial view of Continental final assembly department. This shows long lines of engines on their way to the testing department

Continental Block Testing Department



Fig. 19—This illustration shows the electric starters on tracks between test block and the endless belt on upper right which is controlled from and carries engines direct to shipping platform

parts to the Continental test: First, the running in, in which they are driven by external power; second, the first test run where they run under their own power; and, third, the final test before shipping. Should anything develop at the final test, the engines are taken down, adjusted and corrected, and again tested until they are satisfactory. It takes three overhead cranes to move the engines around the various parts of the test department, and, in addition, the endless belt carries them to the shipping department from the test room.

The shipping department parallels the track upon which the raw material first came in, the shipping platform being on the opposite side of the track from the receiving platform. Thus the engines in passing through the Continental factory have completed a circuit and, while never once retracing their path, have been progressively manufactured and assembled from start to finish.

This layout, which was developed during the time the

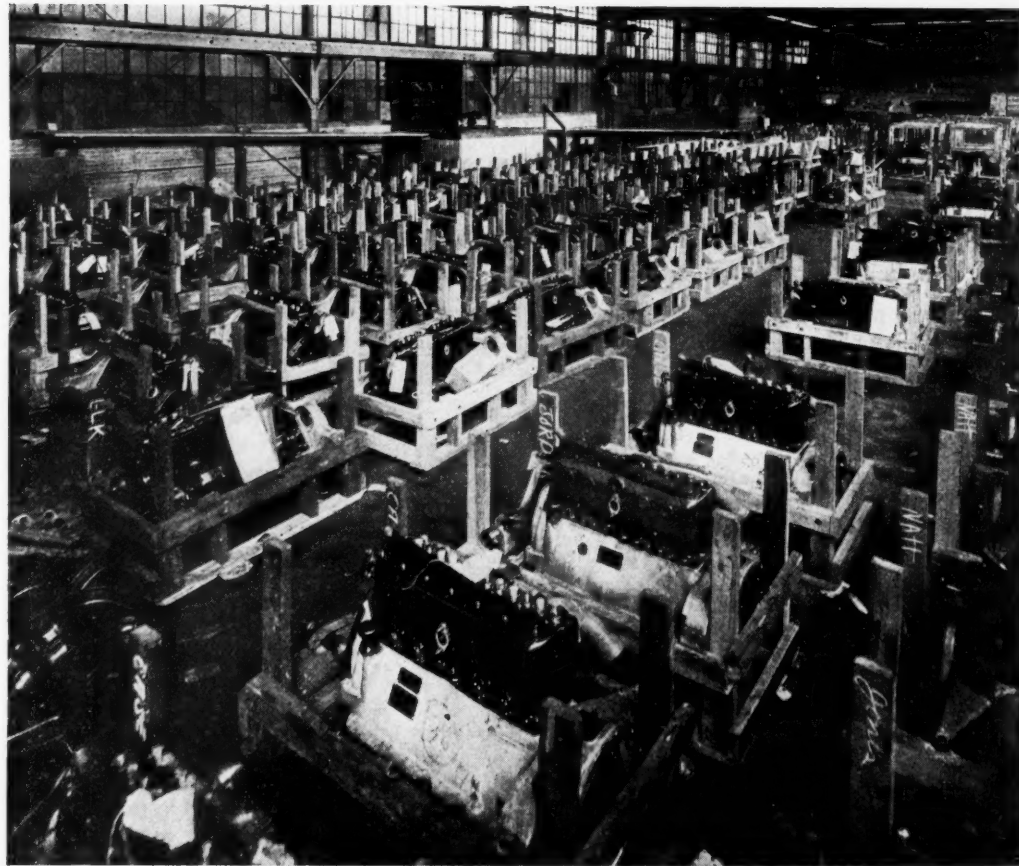


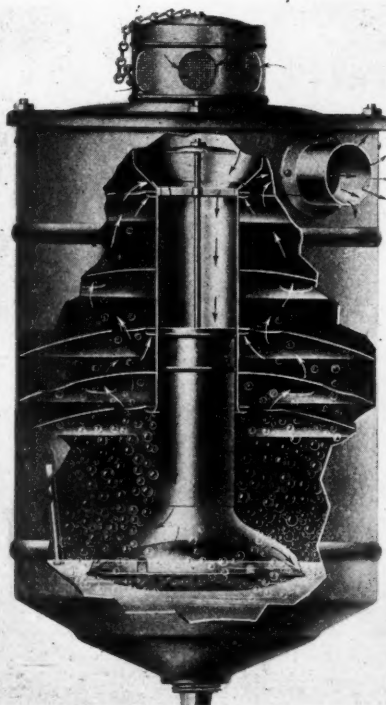
Fig. 20—Shipping platform, showing engines in crates ready to be packed in the cars. The type of crate shown is used only when engines are shipped in carload lots

company was engaged in the manufacture of Class B Government trucks, is being continually perfected and is resulting in increasing plant efficiency.

R. W. Parrett Water-Type Air Cleaner

ROSS-WORTHAM CO., McCormick Building, Chicago, is manufacturing the Parrett water-type air cleaner herewith illustrated. Air enters at the top and is drawn downward through the central tube. The lower half of this tube is flared out "bell shaped" and is supported on a metal float of elliptical cross section slightly smaller in diameter than the bottom of the bell. The air passes through the narrow ring-shaped opening between the bell and the float at very high velocity. On account of the shape of the air stream no large air bubbles can pass through the water, and on account of the high velocity of the air the heavy dust particles are thrown directly into the water. The air itself is so thoroughly mixed with the foaming water that the lighter dust particles are also trapped and the mud settles to the bottom of the tank, whence it can be drained off daily, or as often as is necessary.

This thorough mixing of the air and foaming water settles the dust, but the next big problem is to separate the water particles from the air before it leaves the washer. A series of baffle plates is claimed to do this very effect-



ively, and experience has shown that not over one quart of water is evaporated in an ordinary day's operation.

The restriction of the air flow through the washer is practically negligible, being about 2 in. of water under full engine load, which is very small compared with the drop through the carbureter. Tests are said to have shown that in spite of the slight frictional resistance, engines have developed slightly more power with the washer.

An overflow is provided to limit the high water level and an indicating disc attached to the float tube not only shows the amount of water in the tank, but also automatically shuts off the air inlet when the water level reaches the low point.

While high efficiency is claimed for this air washer, the makers wish to call attention to the fact that the washer can be placed to better advantage than in the very dustiest part of the tractor and that all air piping from the washer to the hot air stove and thence to the carbureter should be absolutely tight.

The need of air cleaners is now fully recognized and practically every tractor carries one.

The Ohio Tilted Rotary

A Heavy Duty Machine Tool of a New Type Designed to Reduce Idling Time and to Insure the Best Cutting Conditions

THERE are certain recognized disadvantages in conventional milling machines that have limited their use in manufacturing operations in the past. These may be classified as follows:

1. Idle time between cuts.
2. Lack of rigidity due to the multiplicity of parts required when great versatility is aimed at in a single machine.

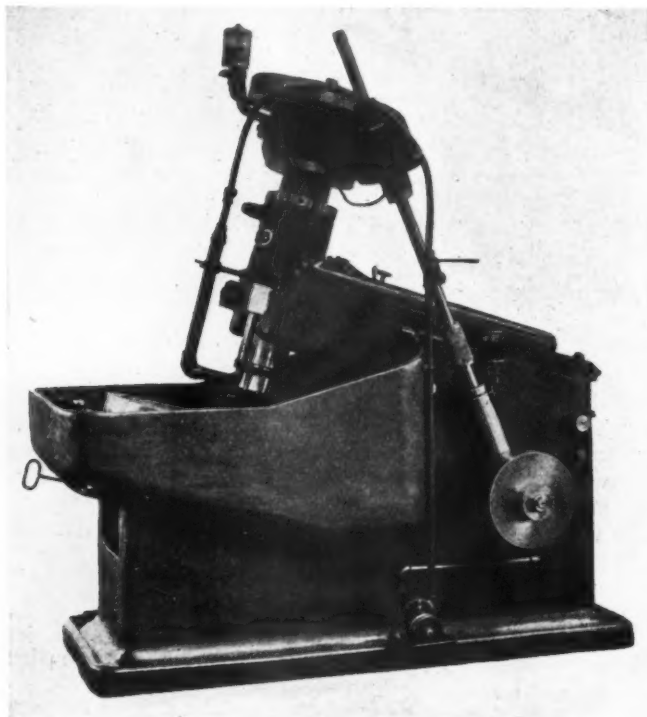
3. Insufficient lubricant for cooling cutters.

The Ohio Tilted Rotary is a continuous production milling machine designed with complete disregard for precedent. The designer's object evidently has been the production of a machine sufficiently rigid and powerful to overcome the limitations enumerated above. The different phases of the problem were studied separately and the features of construction and application of the new machine can best be studied by analyzing it from these three standpoints.

Idle Time Between Cuts

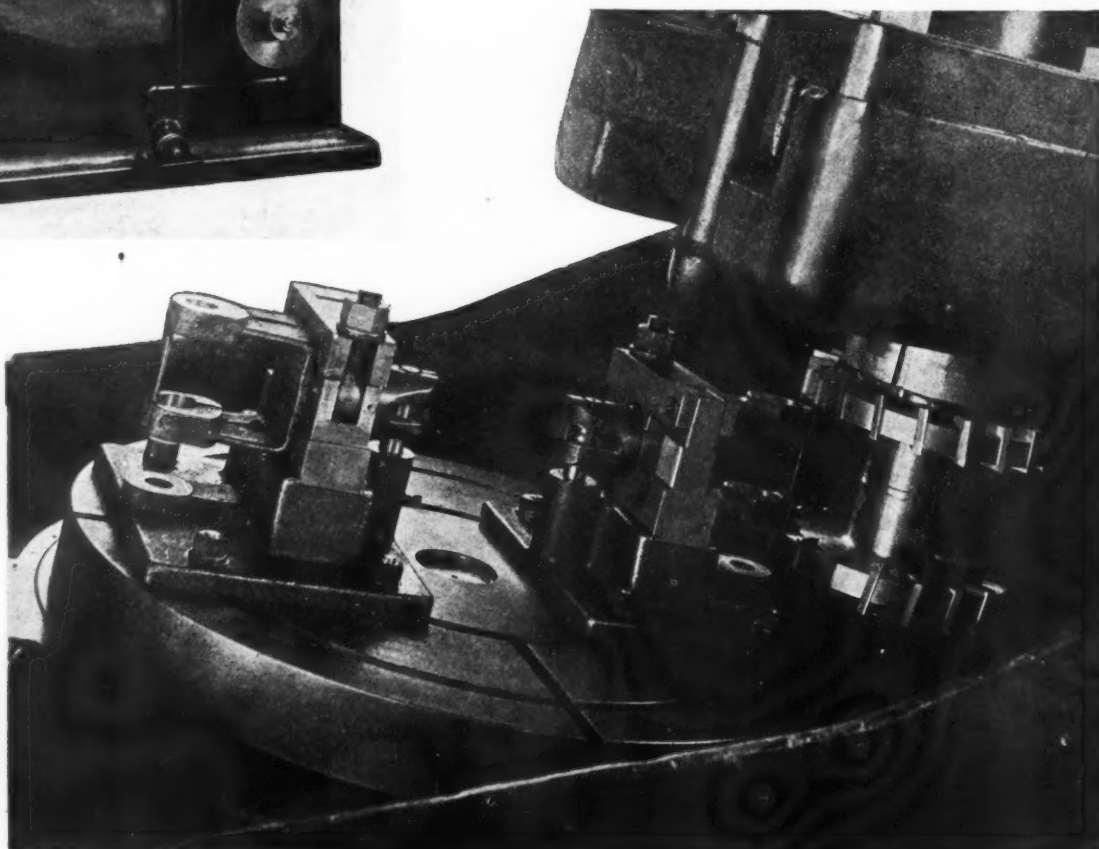
The time spent in returning the ordinary sliding table, removing the finished work, clamping the new piece in the fixture and again bringing the cutter to the working position is non-productive time. Continuous milling eliminates this time loss, with a consequent increase in the output per hour. This is accomplished on the Ohio Tilted Rotary by a rotary table which carries the work to the cutting position, and on which work is being replaced at the opposite side during the cutting operation. This continuous operation of the machine not only eliminates loss of time, but also sets the pace for the loading operation and results in a uniform output over a given period of operation.

The cutter can be held in a fixed position and the table



Side view of the Ohio tilting rotary, showing coolant circulating pump, drive of cutter head, etc.

Straddle milling an automotive part in the Ohio tilting rotary





Samples of automotive parts that can be advantageously finished in the Ohio rotary

rotated continuously by automatic feed for continuous milling, or the cutter may be reciprocated radially in combination with an intermittent motion of the table, controlled by an indexing mechanism. This indexing mechanism is capable of from 2 to 72 divisions, and the table revolves rapidly between divisions so as to reduce the idle time.

By feeding the cutter radially over the surface of the work the loss of time between milling of the surfaces is avoided on such jobs as cannot be compactly spaced. Other advantages gained are that non-productive time of cutter approach is avoided, that the cutter travels the shortest possible distance, that two or more simple fixtures may be used instead of one large fixture, and that the machine will work efficiently on small lots.

Rigidity

Rigidity is secured by using a minimum number of parts and making these of massive construction. The body of the machine is cast in one piece, which in its general lines resembles a punch press or a shear. The working surface of the table and the cutter spindle are both contained in this massive casting, and the possibility of deformation under load is therefore reduced to a minimum. The body of the machine is directly under the circular table. There is no overhang on any part of the machine, the ram bearings being extended in front so that even in the advanced position of the cutters the full length of the ram is effective.

A worm wheel of 28 in. pitch diameter, driven by a worm of 1 1/4-in. pitch and 4-in. diameter, drives the circular table. The worm wheel is located as close to the table surface as the taper table bearing will permit, and is bolted and pinned to the table at the end of the bearing, the central stud merely serving as a means of aligning

the worm wheel and table. This table bearing comprises 475 sq. in. of bearing surface, and this surface is straight. The ram bearing has a total surface of 1000 sq. in. and three gibs are provided for adjustment in all directions.

The spindle carries a No. 16 B & S taper and the cutters are positively driven by means of a clutch in the end of the spindle. A flywheel is mounted on the other end of the spindle to steady the motion of the cutter as it is driven through the work. This feature, in connection with the massive construction of the machine, tends to eliminate vibration, which latter is detrimental to the permanence of the cutting end of the tool.

Provisions for Cooling Cutters

Coolant is raised by means of a pump (circulating 35 gal. per min.) several feet above the surface of the table, and is then expanded into a large pipe so that it falls on the cutter and work under practically no pressure. This system prevents splashing that would be caused by a high velocity of flow, and the coolant is carried around by the revolving cutters so that it passes over the cutting edges during their idle travel.

The tilting table gives a low, pocket-like cutting position, and a greater flow of lubricant may be used without splashing than would be possible on a horizontal table. The flow washes practically all the chips away from the work, the tilting table assisting in condensing them in the space provided in the base of the machine.

The tilting table makes it possible to use an auxiliary pan so that the cutters could be run entirely beneath the surface of the coolant, and the work emerge from it at the loading position. The coolant drains from the chips into the base of the machine, which forms a reservoir of 60-gal. capacity. This "sub-surface" cutting is not provided for in the regular equipment, however.

General Description of Machine

The machine is driven by a 4-in. belt from a line or jack shaft on top of the machine. Power for driving the spindle is transmitted from the pulley, through mitre gears to an intermediate shaft which connects with the first change gear shaft in the speed box by means of a second pair of mitre gears. A single pair of change gears connect the first and second change gear shafts. "Pick-off" gears are used on the two shafts to vary the spindle speeds. A bevel pinion on the second change gear shaft meshes with a bevel gear on the spindle.

The intermediate shaft is splined at the upper end, at the pulley shaft and first intermediate shaft trunnion, to allow reciprocation of the ram.

The intermediate shaft is made in two sections which are joined by means of a coupling. By uncoupling and turning the first change gear shaft through half a revolution the opposite end of the upper half of the intermediate shaft couples with the lower section. This reverses the direction of rotation of the spindle and allows the use of either right or left-hand face mills as desired.

The "pick-off" change gears provide 30 spindle speeds, using 30 (15 pairs) change gears. Ball bearings are used in the driving mechanism wherever practical.

The spindle is carried in a sleeve, on the upper end of which is the speed box casting. The lower spindle bearing is 4 1/2 in. in diameter and runs in a phosphor bronze bushing. The upper spindle bearing is a radio-thrust ball bearing. A clutch in the end of the spindle provides for positive driving of arbors, and the spindle is bored for a No. 16 B & S taper shank.

A flywheel weighing 250 lb. is mounted on the upper end of the spindle. The spindle sleeve is adjustable vertically by means of a graduated collar engaging with a coarse thread on the spindle sleeve. The spindle sleeve

is clamped firmly in the split barrel of the ram after adjustment.

The ram is fed radially over the surface of the table by means of a cam. The cam feeds the ram forward slowly during the cutting operation and allows it to drop back rapidly at the end of the stroke. The relative radial travel of the ram is made adjustable by means of a slide mounted under the ram. The slide is operated from the side of the ram by means of a ball crank lever and is clamped by means of a knurled knob. A double row ball bearing serves as a cam roller.

The pulley shaft extends through the machine and drives the feed box mechanism. Operations of the feed box are controlled by a push rod extending along the side of the machine to within reach of the operator.

The camshaft is driven by a worm and worm wheel in the feed box. A four-gear feed change mechanism regulates the feed of the table when the continuous table motion is used, or the rate of revolution of the cam when the indexing mechanism is used. The cutting feeds, therefore, are established by the ratio of these change gears. "Pick-off" gears are used to obtain these ratios.

The entire indexing mechanism and cam may be omitted for a machine on which only the continuous feeding table is desired, or the indexing mechanism may be added to a continuous feeding machine at any time.

It should be noted that the feed change gears regulate the rate of travel of the ram, and the throw of the cam regulates the length of travel of the ram.

A crank operated shaft is provided so that the feed mechanism may be operated by hand when setting up or trying out a job. A lever is also provided for tripping the index mechanism.

The cam is driven by jaw clutch teeth and may be quickly removed by withdrawing the camshaft.

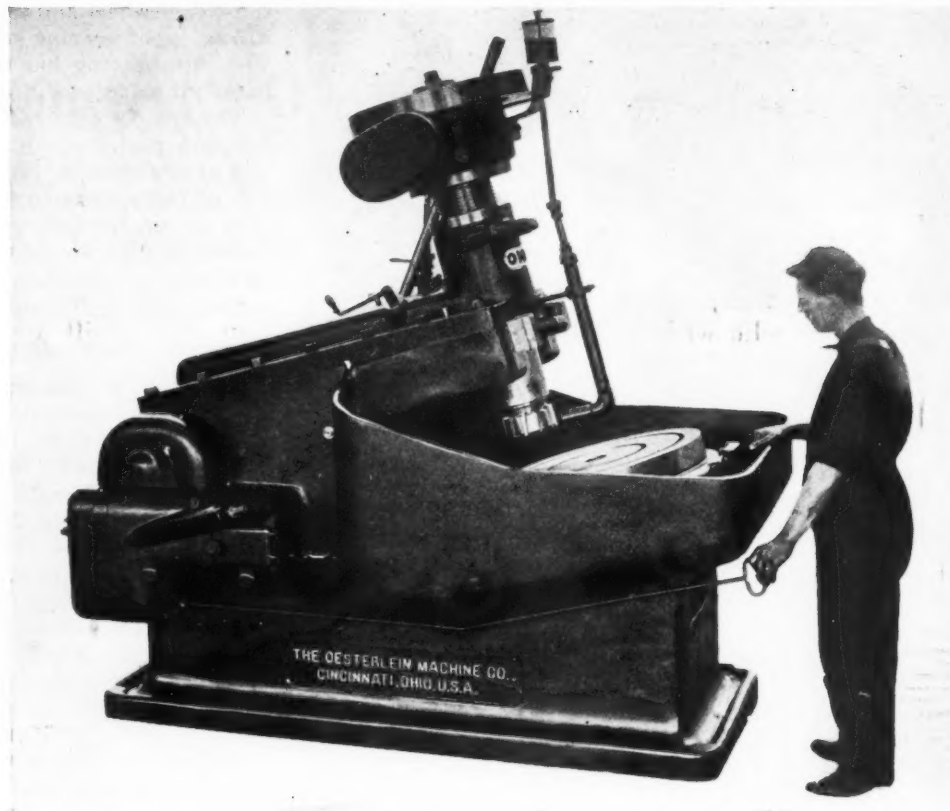
The rotary table is set at an angle of 15 deg. and is 30 in. in diameter. It is driven by a hardened worm and a worm wheel.

A large central distribution oiler on the speed box provides for speed box and spindle requirements, and a similar oiler lubricates the pulley shaft. A central oiling point located at the top of the ram provides distribution to the ram slide, and similar provisions are made for the feed box mechanism and for the table bearings.

Recording wattmeter tests show that the machine running at high speed without cut consumes $1\frac{1}{2}$ kw. of power, including the motor and the lubricant pump. The pump alone delivering full stream requires about $\frac{1}{2}$ kw.

Applications of the Machine

The mechanism necessary to provide for quick adjustment of the machine has been omitted, so that simplicity of construction and rigidity may be obtained. The machine is, therefore, a production miller, applicable in a practical way only to such jobs that by reason of the quantity justify the necessary set-up time.



Ohio tilted rotary and operator

The machine when used as an indexing machine permits of the use of two or more simple fixtures instead of a large one-piece fixture holding many pieces. This feature greatly broadens the field of application and reduces the expense of tooling. By feeding the cutter radially over the surface of the table the advantage is gained that the table is indexing while the cutter drops back to the starting position, and the radial travel eliminates cutter approach and also the non-productive time spent in passing from one piece to another on the continuous feeding machine.

The Indexing Table

The indexing table in connection with a radially feeding cutter permits of dropping a cutter into the work, and such operations as Woodruff key-seating are possible with the indexing system, whereas they are impossible on a continuous feeding machine.

Other applications of the machine when used as an indexing miller are: Cutting a keyway along the length of a shaft or stud; facing off bosses or other surfaces in a plane that is not accessible to a stationary cutter and a continuous rotary table feed, and the milling of small surfaces on large pieces, where the loss of idle continuous feeding time would more than offset the gain of continuous loading.

The adaptability of both the continuous rotary and indexing combinations permits of the advantageous use of the machine in shops where several widely varying operations are performed and the lots are comparatively small. As an example of the above, in a shop producing 200 warehouse trucks per month, six pieces requiring nine operations entering into the construction of the machine may be performed with equal facility on either the continuous feeding or the indexing combination of the Ohio Tilted Rotary.

Looking Forward--The Engineering Issue

ATENTION is called to the Engineering Issue of AUTOMOTIVE INDUSTRIES, which will be issued June 12. The material for this special number is well in hand, and it will become an important part of the data of the engineer who wishes to be fully informed of developments in the automotive field.

The AUTOMOTIVE INDUSTRIES' staff has searched the field and special articles, prepared by men connected with different branches of the industry, have been obtained.

The tractor field, which is developing at a marvelous rate, will be discussed from every angle. In addition to several articles on the principles of design there will be an article discussing tractor features from the user's standpoint.

Trucks are presented from similar viewpoints. The question of loading and unloading, always a vital one in the use of the vehicle, is given special attention. The effect of truck design on sales is an interesting question.

The airplane industry has before it some great primary problems. These also are presented by the men who must be depended upon to reach a satisfactory conclusion.

Trends in automobile design, both in this

country and abroad, will receive attention, and the articles under this heading will prove both timely and interesting.

The new factors in the labor situation, recently a strong feature of AUTOMOTIVE INDUSTRIES, will be reviewed. The progress made toward the solution of these problems will be presented in an informative and helpful article.

Foreign trade is rapidly developing for the automotive industry, and every factory going into export production now is confronted with new problems in this connection. You will find some of them treated in the Engineering Issue.

Finance, tariff, production and other important phases of the manufacture of automotive products are all covered in this Engineering Issue. They form the link that connects the laboratory and factory with the executive departments.

The war led to much productive research on materials and fuels. These fields are changing, and reports from investigations made for war purposes are becoming available for publication. Some of these reports will be found in the Engineering Issue and they will throw much light on the progress of the industry.

Three-Piece Wing Beams as Strong as Solid Beams

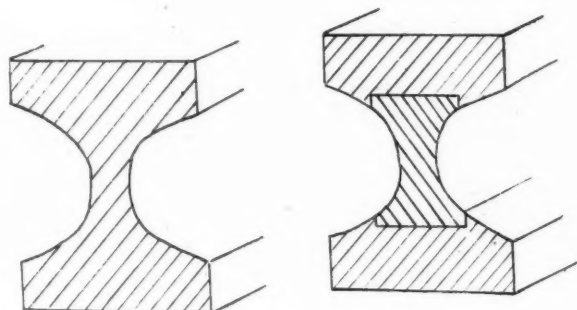
BENDING tests conducted upon DH-4 I-beams built up of three parts (two flanges and a web) and solid beams of the same cross section indicate that the two types have practically the same strength.

Ten test beams of each type were constructed as shown in the accompanying sketch. The specimens were made of closely matched material, the solid beams and the flanges of the 3-piece beams being cut side by side from planks of clear Sitka spruce. Cold casein silicate glue was used in making the built-up beams.

Under 4-point loading, which simulates the actual loading in service, the average maximum loads sustained by the two

types were nearly the same. The difference was in favor of the built-up beams, but was too slight to be significant.

The construction of I-beams of 3 pieces as suggested offers certain obvious advantages. It permits the utilization of cross-grained material in the web, and since smaller pieces are required than in the case of the 1-piece I-beam, it is probable that from two to four times as many beams could be produced from a given amount of lumber.

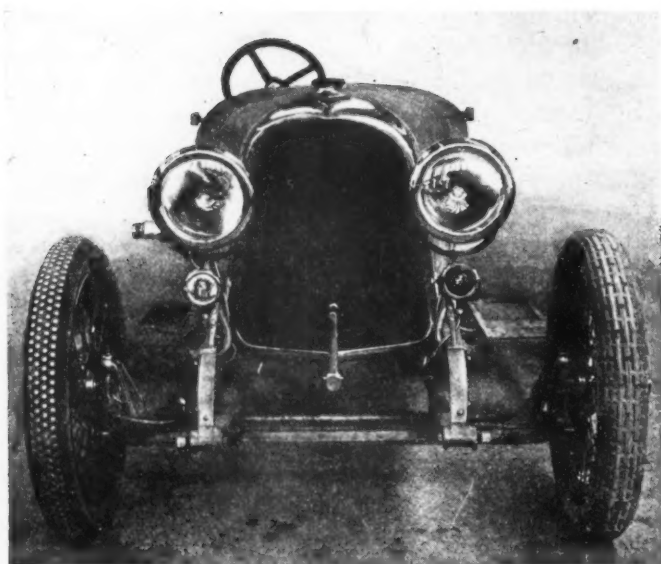


Use of German Army Trucks During the Transition Period

THE German Government "Reichsverwertungsamt" (Reconstruction department) has just organized three new sub-departments with a view to the utilization of returned army trucks, etc., for transit purposes in the country, to help out the situation owing to railway traffic difficulties. The first of these deals with the sale of trucks, tires, etc., the second is concerned with the control and release of available vehicles and the distribution of new tires. The latter, however, are only available in very limited numbers—much less than necessary to meet requirements. There are branches of these organizations in various towns. The third section deals purely with transport matters, and is described as a "general utility undertaking."

Voisin's Initial Chassis

By W. F. Bradley



Head-on view of the Voisin

PARIS, May 1—Gabriel Voisin, pioneer airplane builder, has entered the automobile industry with a high-class 4-cylinder, 30-hp. Knight engine car. The Voisin, which will be built in small volume with a view to the highest possible quality, has a number of distinctive, detail features.

The cylinders, which are a block casting of 95 x 140 mm. (3.5 x 5.5 in.), have a detachable cover over the head completely enclosing the spark plugs. The magneto is driven from a cross-shaft, which also operates the water pump, and the ignition wires are taken to the plugs through a passage cast in the cylinder block. When the fan is removed no working parts are visible.

Although a comparatively small engine, the crankshaft is carried in five bearings, the main bearings having a substantial length of 3.1 in. Lubrication is under pressure to the main bearings and by means of constant level troughs to the connecting rod bearings. In addition to this main lubricating system, there is a supplementary oil feed to a point around the exhaust ports. This supplementary supply is only opened when the throttle is in full open position. Further, the pressure on the supplementary line is reduced by means of a reducing valve in relation to the pressure on the main line. It is found that the pressure suitable for the main bearings is altogether too high for delivery to the sleeves.

In general features of design, the engine follows the usual Knight practice. It should be pointed out, however, that the Knight patents are no longer valid in France. The decision of the courts rendered just before the outbreak of war

held that the Rolland-Pilain sleeve valve engine constituted a priority.

In designing the Voisin, considerable attention has been paid to those details which interest the man who spends a considerable amount of time on the road; for instance, the number of sizes of bolts and nuts has been reduced to three throughout the car. The mechanism has been made as self-lubricating as possible. The design is simple, and wherever possible parts have been rounded off in order that dust and dirt may not collect.

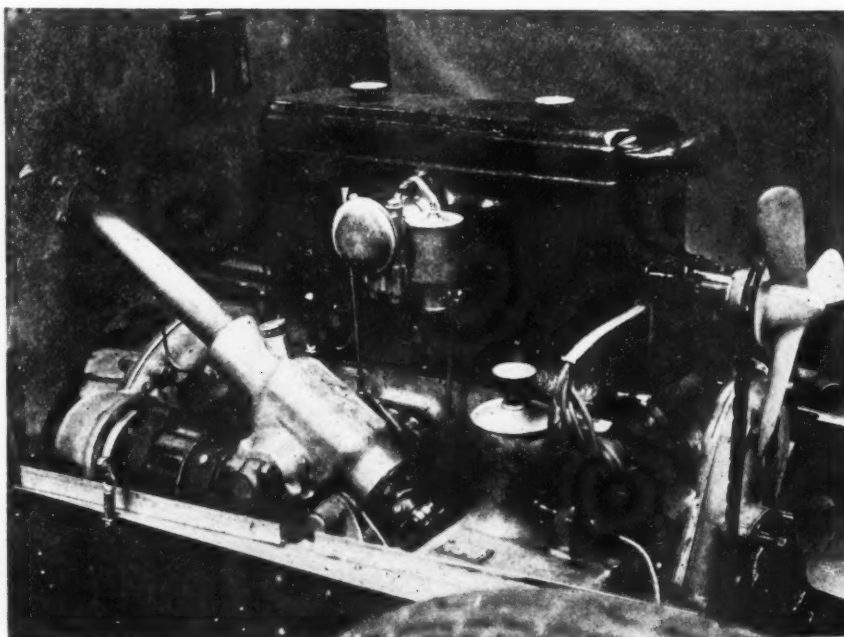
The carbureter is a Zenith horizontal, fed with gasoline by means of the vacuum system. On the right-hand forward crankcase hanger there is a combined oil filler and breather. When this is swung back to allow oil to be poured in the base chamber, a level cock is opened so that if the engine is filled with oil in the dark it is impossible to raise the level above the required limit. At the same time there is an oil level indicator on the side of the engine base chamber.

Water Pump

The water pump has a gland kept tight by an internal spring. A case aluminum three-blade fan is fitted, but the claim is made that this is not required except for work in hot cities. The fan and bracket are demountable and a small metal plate covers up the fan attachment.

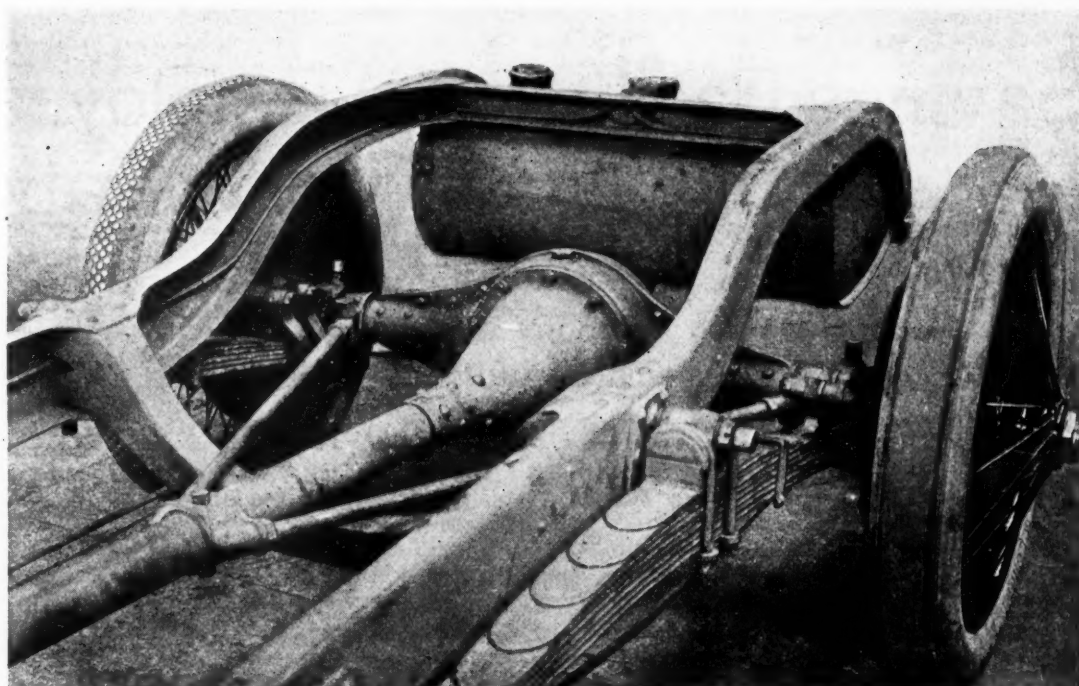
Aluminum pistons are made use of with forged I-section connecting rods, the wrist pins moving in bronze bushings fixed in the pistons.

A two-unit lighting and starting set is provided, the generator being on the left side, just ahead of the fly-wheel housing, and the starter on the opposite side, immediately behind the starting gearbox. Unit construction of engine and gearbox with three-point attachment to the frame is adopted. The clutch is a plate type with Ferodo lining.



Carburetor side

Rear axle construction



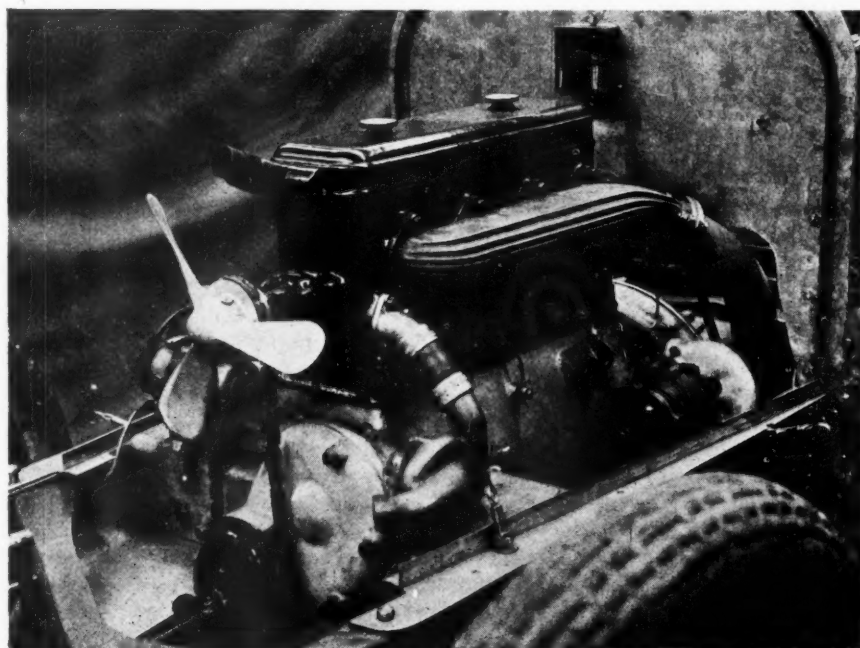
A particularity of the gearbox is that it is cast in one piece, with a detachable plate on the right side. This plate carries the change-speed lever, which consequently is quite independent of the frame members, and it also serves to insert the gear shafts. There are oil collectors immediately above the gearbox bearings, and after lubricating the rear bearing the oil flows to the forward universal joint.

The rear axle is of the banjo-type, formed of two forgings, riveted and welded together. To the forward face of the axle housing is bolted the casing carrying the driving pinion, and riveted to this casing is the tube surrounding the propeller shaft. There is diagonal bracing from the two ends of the axle to a collar on the propeller shaft housing. On the rear of the axle housing there is a light aluminum inspection cover.

Springs are long, cantilever type, pivoted to a bracket

on the side frame member and attached to the axle by means of a spherical instead of the usual cylindrical attachment. Although a lubricator is provided for the collars receiving the rear ends of the two springs, any oil which leaks along the propeller shaft is carried to this collar and thus provides additional lubrication. Both sets of brakes are on the rear wheel drums, but instead of being set side by side, as is the usual European practice, they are mounted concentrically. The brake shoes are lined with ferodo, and instead of the operating cams coming into direct contact with the shoes, they attack a hardened adjustable nut on the latter. This gives an additional brake adjustment, and also enables the brake cam to operate at a correct angle at all times.

Right-hand steering is adopted, and a polished aluminum dashboard with a false front for carrying the instruments is provided. Standard equipment comprises either detachable wire wheels or the Michelin steel-disk wheels. All chassis are built to receive custom bodies, but the chassis are turned out complete with wheels, tires, wheel carrier, electric lighting and starting, head, side and tail lights.



Exhaust side

Italy's Needs in Machine Tools

THE provision of machine tools for their expanding industries after the war is exercising the minds of prominent Italians. One-tenth of these imports before the war was supplied by England, three-tenths by America, and six-tenths by Germany. The last named country will, however, cease to count among Italy's suppliers, and her requirements will have to be met elsewhere. To this end, says *Engineering*, a company was recently formed at Milan which, pending the time when Italy is able to provide for her own wants, will control the business of machine tool imports, among which agricultural motors and machinery take a leading place.

Savings Facilities for Employees Make for Stability of Organization

Plan Must Be Without Taint of Paternalism and Workers Must Have the Freedom of Dealing at Will with Regularly Recognized Financial Institutions—Real Property Interest Serves to Stabilize the Interest in the Work and in the Community

By Harry Tipper

IT requires only a cursory comparison of the present day attitude toward the workers with the attitude of ten or fifteen years ago to determine the advance which has been made in the understanding of the effect which the physical surroundings of the worker have upon his industrial capacity. It is obvious, further, that we have developed a more human standpoint in the consideration of industrial organization and are not ashamed of some sentiment in connection with our business requirements.

We are not yet at the point where we realize that production efficiency is almost a by-product of organization harmony, but we have begun to realize that a man's health, his home conditions, his financial status, his recreation and his surroundings all exercise an influence upon his productive capacity which is none the less important because it is not capable of exact measurement.

There has been a big development in the last fifteen years in the direction of providing light, airy, comfortable and pleasant places to work, in extending the facilities of the industrial establishment for the purpose of the workers' recreation, in establishing hospital facilities and other arrangements calculated to maintain the health of the worker and in providing such surroundings as will tend to suggest pleasant, comfortable and healthful associations and not merely the grinding necessities of labor, which were frequently suggested by the older factories in their deficient conditions and depressing environment.

Surroundings That Stabilize Labor

Managers and employers of labor all over the country are giving attention and consideration to all possible factors which may have a bearing upon either the stability of labor in its productive work, or its efficiency in quantity of production. A trip into this or that factory is always suggestive to the man whose eyes are open, because of the different methods employed by the different concerns in dealing with these human necessities and in endeavoring to provide such working surroundings as will stabilize the conditions.

It is indicative, as a natural development out of the work of the previous years and the present conditions in the building trades, that so many manufacturers should be interested in the housing question at this time and actively engaged in finding a solution, or providing a solution, for the housing trouble in their immediate localities.

Much discussion has occurred upon the best ways of tackling all these matters, the best methods to be adopted

in taking care of the necessities of the case and upon the developments which can be worked out without the stigma of paternalism on the one hand or without radical departures from practice, on the other hand, which may not be justified.

About two weeks ago the writer visited a large concern in New England, one of the old established New England manufacturers engaged in the metal trades, noted for fair treatment of the worker and for the justice of their dealings with the workers' demands or necessities. This concern established, some little time ago, a system of representation by elected representatives of the employees upon a joint committee with an equal number of representatives of the management; to have jurisdiction over the question of wages, hours and working conditions which demand consideration from time to time and to evolve a method of dealing with the personal grievances of the individual employee in such a way that they would be properly adjudicated.

System Considered Satisfactory

This system is based upon a similar plan to those adopted by the Standard Oil Co. of New York, The Midvale Steel Co., Colorado Fuel & Iron Co. and others that have been mentioned in AUTOMOTIVE INDUSTRIES. It has been in operation for about a year, and conversation with the executives of the company and with the workers developed that it is considered entirely satisfactory on both sides. The employment manager in this particular institution, or, rather the manager of industrial relations, has proved to be an unusually capable man, having fully satisfied the owners of the concern, and at the same time sufficiently satisfied the workers that his position and the justice of his actions have been commended by the labor leaders in that vicinity.

In the course of the working out of this system, or during the year, it developed that a number of the workers were carrying large amounts of cash, representing their savings, because of the inability to open bank accounts during the hours when they were off duty and their diffidence about going to the banks to deposit money or draw it out during the hours of work while wearing working clothes. This suggested to the management the possibility of making an arrangement with the local banks by which the employees could open savings accounts at the pay office of the company, receiving receipts for these accounts and having them credited on the books of the savings banks as though they were deposited at the receiving teller's window in the ordinary way. The system by which this was arranged was copy-

righted by the man who got it up and bought from him for use by this concern.

In many of its details it is somewhat similar to the thrift stamp book, except that each bank has its own books and stamps and methods of receipting, which have no value outside of its own doors. The details of the system, of course, are important in its actual operations, though the problem is sufficiently simple that any intelligent accountant can arrange for a proper system of taking care of the actual transactions.

The interesting point about this whole thing was that in this manufactory, which is some distance from the business section of town, there were thousands upon thousands of dollars lying idle in the pockets of the workmen, not because they did not see the value of a bank account or because they were unwilling to trust the bank, but because it was inconvenient to get to the bank during the hours when it is open; while during the leisure time of the worker when he was prepared to go into the center of town all the banks were closed and there was no possibility of depositing or withdrawing any money.

Has Met With Enthusiastic Support

It further developed that there was a great deal of enthusiasm among a large proportion of the workers for the opportunity presented by this arrangement and a great many of them took immediate advantage of it to deposit considerable sums, representing savings which they had been obliged to carry around for lack of any other means of care.

This is not the only case in which arrangements have been made to stimulate the saving of money by the workers and to make it easy and convenient for them to deposit those savings in a recognized institution for the purpose.

A departure from this scheme, with the same object in view, was indicated in the annual report of the Lever Bros., Ltd., makers of Sunlight soap, in Liverpool, England. It was stated in this report that the company had decided to do away with the method of paying the workers at the office, necessitating their standing in long lines waiting to be paid, and instead it had arranged with the banks in Liverpool to open an account for every individual employed with the company and had arranged to deposit at the bank each week an amount equal to the amount earned by the employee, which amount could be withdrawn from the bank or used as an account at the bank in the usual way. It was calculated that with the number of employees at the works it was necessary for some of them to wait half an hour in order to be paid, and that this was not only inconvenient for the workers but distasteful to them as well, besides making it troublesome for them to go to the bank afterward and deposit any money. It is understood that the banks arrange to be open special hours to accommodate the employees of this company who may desire to deposit or withdraw money and who cannot arrange to be at the bank during the ordinary hours of operation.

Wherever it has been made convenient for the workers to deposit money in the regular financial institutions and to save money, there has been a large response from a very considerable body. Although the examples of industrial corporations offering these opportunities to their workers are not very numerous, they suggest that the reason why so many of the workers have not used the banks as depositors is not so much because of their dislike for the banks or their desire to spend what they earn, but that the inconvenience of reaching a bank to deposit the money which represents their surplus may have a great deal to do with their neglect in this matter.

The advantage, of course, of workers saving money is so obvious that it is not necessary to dwell upon it. The advantage of encouraging them to deposit their savings in the regular banks so that the money may be kept in circulation is equally obvious; but there is an additional advantage to the concern which provides opportunities of this kind for its workers, that they are directly contributing to the stability of the individual worker and to the stability of the workers as a part of their organization and providing a service, the value of which a considerable proportion of the workers appreciate and take advantage of.

The plan, of course, calls for a slight additional expense on the part of the company, and this must be justified by the importance of the matter. The executives of the companies who have adopted the idea in one form or another evidence their information of its value and their impression of its importance from the spirit in which it has been received by the workers and the advantage that has been taken of it wherever any such plan has been put in motion.

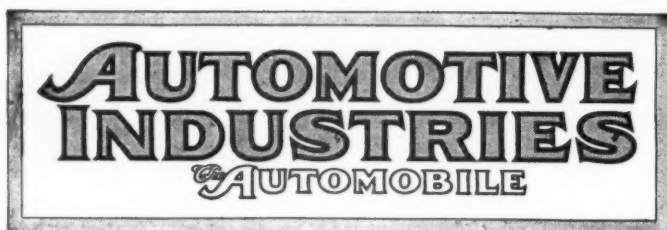
It is mentioned because all items of that kind have a bearing upon the labor situation and the interest of the worker in the banks of his locality. The interest of the worker in saving is an important element in stabilizing the organization and in introducing a more conservative viewpoint among the workers themselves. They are apt to judge matters more carefully when they own a little property and have a real interest in the locality and the country.

Property Ownership Creates Sense of Responsibility

Comfortable housing conditions and the ownership of property, either in the form of a house or in the form of bank savings, bonds or some other tangible property, are very important incentives to the development of responsibility and a sense of orderly necessity in politics and in business. It is not a mere coincidence that most of the irresponsible radicals of all types are born and brought up in the cities or among the classes who have no interest from a financial standpoint in their local community, in their national government. To such people any change is a good change. Having no responsibility either from the standpoint of ownership or the direct payment of taxes, but possessing political power to the extent of the vote, they cannot lose much as far as they see by any radical development, no matter how theoretical it may be, and they may gain a great deal.

The stability of the French nation is largely due to the individual financial interest in the Government and the locality, and the employer who encourages, even to the extent of considerable expense, the habit of saving and the development of property ownership, by extending the convenience so that it will be easy for the workers to arrange such savings, is providing an opportunity for the development of stability in its organization and its locality which will more than compensate for any expense which may be involved.

BRITISH aircraft papers publish particulars of the Tarrant Giant triplane, said to be the largest heavier-than-air machine ever built. It has six Napier Lion engines, four of which are mounted on the bottom plane and the other two between the middle and top plane. The fuselage is of the monocoque type and of very good streamline form. Originally the machine was designed for long distance bombing, but after the armistice was signed it was decided to convert her into a passenger carrying plane. The span of the middle plane is 130 ft. and the height from the ground to the top plane 37 ft. 3 in. The weight of the machine is approximately 45,000 lb., of which 9000 lb. is available for passengers and cargo and 10,000 lb. is taken up by the fuel.



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Less Publicity, More Action

IF official Washington would actually put into effect but a small percentage of the numerous excellent plans for co-operating with industry that have been announced in the past six months, the American government would be the most helpful of all governments to the industries of the nation.

The desire for publicity has become the "wrench in the gears" of government operation. Department heads apparently call meetings of their subordinates, ask for suggestions, list them and then call for the publicity director, who turns out many pages telling what the department plans to do for the benefit of American industry.

Newspapers and other publications carry the stories. The bureau clips the notices and files them for evidence to be presented to the Congressional committees, and then, as the main object—publicity—has been secured, the enthusiasm wanes and the schemes die. Later a new set of ideas is com-

piled and the same plan followed. When the bureaus and departments think more of aiding industry—of direct profitable action—and less of publicity, the only value of which is to obtain the appropriations necessary to insure jobs, there will be a more genuine governmental co-operation with business.

What Shall We Do With Our Bureau of Standards?

DURING the past two years the Bureau of Standards at Washington was engaged almost entirely in scientific work connected with the prosecution of the war. Feverish activity was developed by practically every department; new buildings were erected, much new equipment was installed, and the personnel was greatly increased. Under the imperative demands of the war the Bureau grew as much in two years as it probably would have grown in two decades under normal conditions.

The cessation of hostilities, and of practically all manufacturing activities in connection with the war, has caused a slackening in the demands made upon the Bureau. As an instance in point, the immense amount of work which was done in connection with the development of the Liberty engine and its accessories has been carried to fruition, and there is less demand than during the war for the use of the special facilities collected for this work. The activities of practically all branches of the Government are shrinking at a very rapid rate, and the calls made by Government departments have greatly lessened.

We are thus left with a highly developed national institution for scientific research, without any definite program for its utilization for the best interests of the Nation. True enough, the Bureau was originally organized for a definite purpose, and previous to the war it had a well-defined program, but anyone who watched its expansion during the war knows that it has long outgrown this program.

During the past few years, industrial research has become a subject of tremendous importance. It was well-organized research that gave Germany its lead in certain industrial lines previous to the war. Thus, when hostilities broke out the allied countries were cut off from their sources of dyes, optical glass, and certain medicines, among other products. Their only salvation lay in rapidly organizing for intensive research work, and this the respective countries did at once. According to all accounts, the work undertaken along these lines proved highly efficacious. The men engaged in it thus proved themselves capable research workers, and incidentally the value of scientific research was strongly brought home to many people who formerly were inclined to scoff at it. In England, particularly, there has been much talk of co-operative industrial research, and a committee has been appointed under Government auspices to look into plans.

It is generally felt that in the coming struggle for the world's markets for manufactured products,

scientific research will play a very important rôle. At the present time very effective research work is being done by a few of our large corporations, such as the E. du Pont de Nemours Corp., General Electric Co., Eastman Kodak Co., and others, but the great majority of our manufacturers cannot afford their own research laboratories, and if these are to be benefited by the possibilities of research work it must be carried on co-operatively or through the instrumentality of the Government.

As already stated, the Bureau of Standards has far outgrown its original purpose. It is no longer an institution merely for calibrating thermometers and checking weights and measures, but it is a vast research laboratory well organized, well equipped and well staffed. It is quite apparent that the Bureau could be of great service to the Nation's industries, and particularly to the automotive industries, if it were placed on a somewhat different basis. At the present time it concerns itself only with the scientific problems which arise in the work of the various Government departments. Of course, during the war these problems covered nearly the whole range of industrial activities, but in peace times the situation is entirely different.

The Bureau of Standards could act both as a research and a testing laboratory for the industries. As a testing laboratory, it would be an authority in which the public would have confidence. It may not be amiss to mention a specific example of the class of testing work in which the Bureau could engage. Since the sharp increase in the price of gasoline some years ago, a large number of so-called fuel savers have been placed on the market, for some of which rather extravagant claims have been made. It is impracticable for the manufacturers or dealers to give a convincing demonstration of these devices to each customer, as to do so would often involve expense greater than the cost of the instrument. If the inventor or manufacturer of such a device could have it tested by the Bureau, and get a certificate of performance, it would be a tremendous help to him if the performance was creditable. In this way the Bureau would help to gain recognition for inventions of merit, while at the same time its activity would tend to keep off the market devices without practical value, as the public probably would soon become educated to asking for an official performance certificate.

The Bureau and the Automotive Industry

To the automotive industry the Bureau could be of immense service in connection with fuel problems. It is true that problems connected with the production of petroleum fuels are being dealt with by the Bureau of Mines, but this department does not concern itself with the utilization of the fuels in engines. Other automotive problems that can only be solved by scientific research on a large scale relate to lubrication, ignition, and to the properties of metals and other materials of construction.

We would urge upon the automotive industry and the various organizations representing it, such as the National Automobile Chamber of Commerce, the

Motor and Accessory Manufacturers, the National Boat and Engine Manufacturers' Association, and the National Implement and Vehicle Association, to ponder this question thoroughly. If they believe that the Bureau of Standards can be of material service to them it behooves them to speak out and ask that it be made available for that purpose. The fate of the Bureau rests with Congress. But we cannot expect our Senators and Representatives to try to find work for the Bureau. If no demands are made for its services from the industries, then it is likely that appropriations will be withheld and that some parts of the institution will be closed. We all know that there is a strong demand for retrenchment, and the tendency for Congress would be to cut expenses where it could be done with the least opposition.

Now, economy is generally regarded as a virtue, and correctly, but there is such a thing as false economy, and it would certainly seem false economy to condemn to idleness an institution in which the Nation has invested millions of money, which during the war demonstrated its ability to "produce results," and which could be of great assistance to our industries in improving their products.

More Intimate Contact Needed

What is needed is more intimate contact between the Bureau and the industries. The Bureau should be organized on such a basis that its services would be available to any firm requiring research or test work done for such equipment as the Bureau possesses is necessary. Of course, the tests or other work should not be made entirely gratis, as in that case the staff might be overwhelmed with requests for investigations of matters of little importance. Some of the expense might well be borne by the Government, however, as any results achieved would be of commercial advantage to the Nation, and it is a legitimate function of the National Government to aid the Nation's commercial interests. In any case, any fees paid for tests should go directly into the National Treasury and not to the Bureau, the latter being supported entirely by Government appropriations, so that any causes that might tend toward commercialism would be eliminated.

If the automotive industry feels that it can profit from continued research work of the Bureau, somewhat along the lines on which the latter has been working the past two years, then it should not fail to make its voice heard immediately, for once a decision has been made it is always difficult to get a question reopened for discussion. Let the National Automobile Chamber of Commerce, the Motor and Accessory Manufacturers, the National Boat and Engine Manufacturers' Association, the National Implement and Vehicle Association, the American Gear Manufacturers' Association, the American Drop Forge Association, the Electrical Equipment Manufacturers' Association and other industrial organizations petition Congress. Let every individual manufacturer write to his Congressman, that the necessary appropriation should be made to keep the Bureau of Standards going at full capacity, for the benefit of American industries.

Latest News of the

Average Speed of 92.46 M.P.H. Made by NC-4 in Flight to Lisbon

Last Leg of Trip Made Without Incident, Under Favorable Conditions—Hawker Made 1289 Miles Before He Was Forced to Alight

NEW YORK, May 28—The flight of the NC-4 yesterday from Ponta Delgada to Lisbon, 921.21 land miles, in 9.44 hr., completes the initial flight from American to European shores. The NC-4, an American naval plane, was commanded by Lieut. Commander A. C. Read. The following data of the flight, reduced to land miles, were compiled at Washington:

Course	Date May	Distance Miles	Time Hrs.	Speed M.P.H.
Rockaway-Chatham (forced landing about 100 miles off Chatham)	8	345.45	5.45	59.87
Chatham-Halifax	14	368.42	3.51	97.87
Halifax-Trepassey	15	529.69	6.20	83.60
Trepassey-Horta	16-17	1,381.81	15.18	90.27
Horta-Ponta Delgada	20	172.72	1.45	99.83
Ponta Delgada-Lisbon	27	921.21	9.44	94.50
Complete Ocean Flight				
Trepassey-Lisbon		2,475.75	26.47	92.46

The average speed of the planes is an interesting part of the table. The wind velocity is a factor in the variation. The NC boats in tests before this flight developed an average speed of 65 m.p.h. in still air.

The NC-1 and the NC-3, which started with the NC-4 from Rockaway Air Station, made the flight to Trepassey successfully, but failed to reach Horta because of fog. The NC-1 was within 250 miles of Horta when forced to descend to get its bearings and was unable to again take the air. The plane became waterlogged and the crew had despaired of rescue when picked up by the steamer Ionia. The steamer took the plane in

tow but the line broke and the craft was lost. The NC-3, commanded by Commander Towers, lost its bearings in the fog and was forced to alight 80 miles south of the course. The flight was equal to the distance to Ponta Delgada. Only a 2-hour supply of fuel remained and no effort was made to take the air. Instead the NC-3 taxied to Ponta Delgada, 205 miles, entering the harbor under its own power. These flights were not in competition for the London Daily Mail prize.

Hawker Rescue

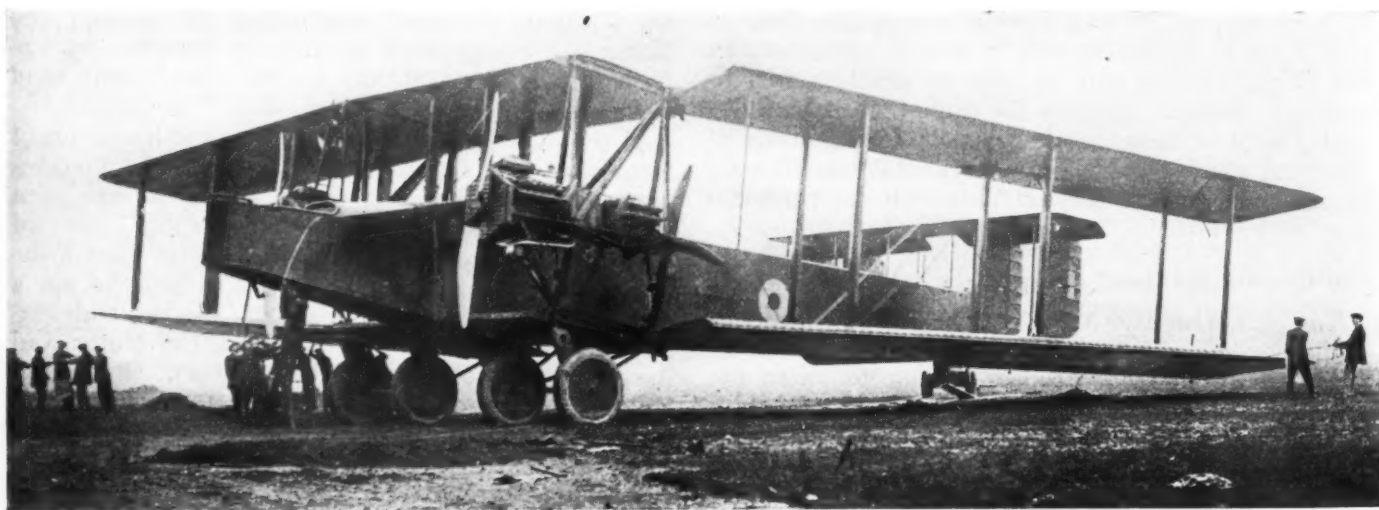
The dramatic rescue of Harry G. Hawker, pilot, and Commander McKenzie Grieve, navigator, of the Sopwith bi-

plane, as announced last Sunday, was a feature of the week's air news. This plane started from St. John's, Newfoundland, at 1:51 (New York time) Sunday, May 19, competing for the London Daily Mail prize of \$50,000 for a continuous transatlantic flight.

The plane and crew were not heard from after the start until the Danish steamer Mary signalled on Sunday that the men were aboard. The steamer had no wireless and had been unable to announce the rescue of the aviators. Hawker and Grieve were taken off the Mary by a British destroyer and given a tumultuous welcome in Scotland and England on their trip from Scapa Flow to London.

Hawker, in his own account of the flight, says that for the first 5½ hours of the journey all went well at a height of 15,000 ft. Owing to choking of the filter, the plane was lowered, but after 12 hours of flight the circulation system again choked. It was found that the trouble was caused by solder and other refuse and it was realized that the trip could not be continued. Then the plane turned across the steamer lane and after two hours sighted the steamer Mary and dropped to the water in front of it. Owing to the rough sea, the men were taken off with difficulty and the airplane and contents were abandoned, but later picked up intact by the American ship Lake Charlottesville and will be taken to Falmouth.

An official announcement by the British Admiralty was:



THE HANDLEY-PAGE TRANSATLANTIC FLIER

Handley-Page "Berlin Bomber," which will attempt a transatlantic flight from Newfoundland. It is fitted with Rolls-Royce engines and with both tractor and pusher propellers, the latter having four blades. It was a machine of this type which last winter made the flight from England to India, a distance of approximately 5800 miles, including 700 miles across the Mediterranean.

Automotive Industries

"Hawker and Grieve were picked up in latitude 50.20, longitude 29.30, having alighted close to the little Danish steamer Mary, owing to stoppage of circulation in the water pipes between the radiator and the water pump."

This statement would indicate that the aviators landed in the Atlantic 813 land miles from the coast of Ireland and approximately 1289 land miles from the point of their departure from Newfoundland.

Hawker, in his statement, says that he and Grieve were picked up 14½ hours after the start from St. John's.

A French Flight

It was announced from Paris that Lieut. Roget left that city at 6 a. m. May 24, and flew 1367 miles to Kenita, 18.6 miles from Rabat, at an average speed of 118.8 miles per hour. He has started on a transatlantic flight to Brazil by the way of Rabat. His descent was caused by engine trouble and the machine was damaged in landing on rough ground. It is expected that the flight will have to be abandoned.

Wills and Lee to Put Up

Plant for New 6-Cylinder Car

DETROIT, May 28—C. L. Wills and John R. Lee, both recently connected with the Ford Motor Co., to-day announced that they have taken an option on 2000 acres on the St. Clair River between St. Clair and Port Huron, 50 miles north of Detroit, on which they will build an automobile factory to employ, eventually, 35,000 men.

The factory will build a 6-cylinder car which Mr. Wills has designed. The price of the car has not been announced.

The site has a 3-mile frontage on the St. Clair River and a plant will be designed for the entire production. Arrangements are being made to bring iron ore from the mines by boat.

Included in this site is a village which will be the foundation of a model city to be constructed by this company.

Mr. Wills was chief engineer of the Ford company and had been associated with Henry Ford for two years before the present company was organized. He had been with the Ford organization for 18 years.

Mr. Lee was in charge of the social welfare, profit sharing and bonus departments of the Ford Motor Co.

These men are regarded as having ample capital, but reports have it that other men are associated with them, but no names are mentioned.

Belgian Manufacturers Preparing to Get Back Into Production

Plants in Deplorable Condition—Ready Cash Scarce—Minerva Motors Reveals Definite Plans of Production and Gives Picture of Recovered Factory

ANTWERP, May 1.—(Special Correspondence.)—The automobile manufacturers of Belgium, who recovered their factories shortly after the signing of the armistice, are at a loss to predict when they will be able to resume production. The plants were in a deplorable condition, and most of the manufacturers have been so busy cleaning up and restoring their plants that they have been unable to give the proper attention to future work. Another drawback is that most factories have an abundance of requisition bonds and no money, and it is difficult in the present market to buy without ready cash.

An exception to this is the Minerva Motors Societe Anonyme. S. de Jong, director of the Minerva works, has definite plans for production, and says that he expects his company to be the first in the market. Mr. de Jong began his preparations for production while in exile in Holland and now will benefit by the plans and the work done there during the war. To a representative of AUTOMOTIVE INDUSTRIES, Mr. de Jong said:

"The first impression when I walked through our plant was that a few thousand Bolsheviks had been let loose in our place for a certain length of time, after which an earthquake had knocked everything to pieces. Not one thing was in its accustomed place, where we left it in 1914. Things which used to be on the ground floor at one time we found in the opposite direction on the roof on the sixth floor.

"We missed 750 machine tools which the Germans had carried somewhere in Germany, with the necessary electric motors, shaftings, pulleys, belting and lots of other installation material. Our warehouses have been robbed of a great part of their contents, and especially of practically every part of brass, aluminum, antimony and other valuable goods. The last six months the Germans had requisitioned us to deliver them every week 1,000 kgs. of brass or bronze goods, and, of course, our stock of spares in that metal has practically disappeared.

"On the other hand, as they had been repairing cars in our place for the last four years, we found several hundreds of broken up lorries of German make, and a few hundred broken up passenger

cars from the same source. They were of the most heterogeneous types and ages, and probably included all cars found unrepairable during the war.

"More than 200 beds were distributed in practically all parts of the building, as parts of it had been used for sleeping quarters.

"The first few months we have been employing 400 to 500 men in cleaning the premises. We have been whitewashing, cleaning, painting as much as we could. Everything which did not belong to us has been removed and we have put in order as much as possible what remained that belonged to us and tried to take an inventory of what was missing.

"We are having some trouble with labor, but fortunately until now these troubles are not so great that we cannot overcome them. Practically all our workmen, a great many of whom had been spread all over England, France, Holland and other countries, have come back and are happy to work in the old place again.

"Fortunately, we had been working during our stay in Holland to prepare substitutes for what we knew had been taken away from our factory. Several hundreds of special machines had been ordered in your country, many others in England and in Holland. During the war we have been making, with the help of a few hundred interned Belgian soldiers, 150 machine tools which we have since brought here.

"As soon as we returned we started buying material and as we have prepared to a great extent the jigs and tools for the new types of cars we will bring out soon, we are now simply awaiting the steamers which will bring over in time the machines and material from your country, as well as from England and France, to be able to start deliveries of our new cars within four to five months.

"In the meantime, we have about 300 men busy repairing the cars for the Belgian army, which army, as you know, has still in use a great proportion of Minerva cars. These were requisitioned in August, 1914, from the private owners and have all been through the war. Some of these cars requisitioned in 1914 were of respectable age then."

France Will Drop 45 Per Cent Import Duty to 15 Per Cent in 1920

Import Restrictions and Heavy Duty on American Cars During War Led Manufacturers to Protest to C. C. Hanch—Demand for American Cars Interrupted by War

Special cable to AUTOMOTIVE INDUSTRIES

PARIS, May 26—It is announced that after the signing of the Peace Treaty, France will adopt a 45 per cent duty on American automobiles until January, 1920. After that date, the duty will be made 15 per cent.

This announcement by cable from W. F. Bradley, European correspondent of AUTOMOTIVE INDUSTRIES, follows recommendations of similar import that were made by the International Congress of Automobile Manufacturers, which met in Paris early in March. The Congress, which included automobile manufacturers of all European countries except the German allies, recommended a tax of 10 per cent on European automobiles and a 45 per cent tax on American.

At that time the import tax in France was 70 per cent on vehicles weighing less than 2700 kilos, but the importation was allowed only by license. About that time the Grouperment des Importateurs d'Automobiles Americaines sent a protest to C. C. Hanch, then in Europe as representative of the N. A. C. C. This protest asked Mr. Hanch to take up at once the problem of opening French trade to American cars. The importers in this protest said:

"Before the war the customs duty on American automobiles was frs. 750 (\$150) per 100 kgs. Now, on June 24, 1916, the tariff was increased to 70 per cent ad valorem on the value of the goods, augmented by all charges for the transportation, war and maritime insurance; this in order to protect French industry, as all the factories were occupied on war work. At this rate, a car costing, say, frs. 8500 (\$1700) in America would pay about frs. 10,000 (\$2000) duty. On April 1, 1917, the French government passed a law prohibiting, purely and simply, all importations of cars of foreign manufacture."

They also pointed out that during the period of hostilities they made no plea for their trade but had waited patiently until conditions had changed. At the time of writing the protest they asserted that the French manufacturers were advertising new models as ready for sale to the public. Hence, the further restrictions of importations could not be with a view of protecting the French manufacturers. They expressed the belief that importation of American cars would be beneficial to the entire country. They did not ask a return to pre-war custom tariffs but asked a tariff that would permit them to resume business.

Figures on American passenger cars exported to France follow:

Year	Fiscal years ending June 30	Value
1912	574	\$469,721
1913	818	615,086
1914	1,427	919,060
1915	451	252,909
1916	2,087	1,428,325
1917	1,367	836,557
1918	1,169	1,518,858
*Government year 1914 includes 1914 to June 30—two months before declaration of war.		
Calendar year 1918		
(to Dec. 31)	1,003	1,134,818
(Obviously this overlaps fiscal year 1918)		
1919		
Jan.	28	128,619
Feb.	82	281,131
Mar.	73	170,893

These figures indicate that there was, before the war, a growing demand in France for American cars. The interruption of the growth of this business in 1915 was due to war conditions. The figures during the war have no direct bearing on the trade situation.

Champion to Make 35,000,000 Spark Plugs

TOLEDO, May 26—The Champion Spark Plug Co. proposes to make 35,000,000 plugs this year. Last year 25,000,000 were produced as against 24,000,000 in 1917. Increased production is made possible by the enlargement of the plant through the purchase of the old Bissell Mfg. Co. buildings. The company now employs 850 in Toledo and 750 in its insulator plant in Detroit.

Nitro Carbureter Sales Through C. A. S. Engineering

NEWBURGH, N. Y., May 26—The Sunderman Carbureter Corp. has closed a deal with the C. A. S. Engineering Co., Detroit, whereby the latter company will handle the sales of the Nitro carbureter to the manufacturing trade.

Hollier Back in Production

CHELSEA, MICH., May 26—The Lewis Spring & Axle Co. is now getting into fair production on the Hollier six. Manufacture of this car, which was discontinued during the war, has now been permanently resumed, but no production schedule has been prepared for the coming year. About 400 men are on the payroll and this number will be increased as production expands.

Standard-Detroit Tractor Dissolving

DETROIT, May 26—The Standard-Detroit Tractor Co. has filed a petition for dissolution in the circuit court. The petition was signed by M. L. Pulcher, head of the Federal Motor Truck Co., and Edward P. Hammond, both stock holders in the company, and others.

Assets amount to \$1,811, and liabilities \$59,490. The company was incorporated some time ago for \$100,000 for the purpose of manufacturing a tractor attachment to Ford cars.

Annual Convention of Drop Forge Assns.

PITTSBURGH, May 26—The annual convention of the American Drop Forge Association and of the Drop Forge Supply Association will be held June 12 to 14, at the William Penn Hotel. Some of the subjects to be discussed are: "The Bonus System in the Entire Forge Shop;" "Testing Materials;" "Electric Welding as Applied to the Forging Industry;" "Sand Blasting versus Pickling;" "Heat Treating Problems That Originate in the Forge Shop;" "Powdered Coal Developments in the Forging Fields."

Officers of both organizations will probably be continued in office. Officers of the American Drop Forge Association are: President, E. J. Frost, of the Frost Gear & Forge Co., Jackson, Mich.; vice-president, J. F. Connelly, of the Champion Machine & Forging Co., Cleveland; secretary, A. W. Peterson, of the American Drop Forger, Pittsburgh; treasurer, E. B. Horne, of the Packard Motor Car Co., Detroit.

Officers of the Drop Forge Supply Association are: President, H. N. Taylor, of N. & G. Taylor Co., Philadelphia; vice-president, Charles Harmon, Jr., of the National Machinery Co., Tiffin, Ohio; secretary-treasurer, A. L. Wurster, of the Sizer Forge Co., Philadelphia.

Passengers Landed on Hotel Roof

WASHINGTON, May 24—An army dirigible type A-4 made a successful landing of passengers on the roof of the Hotel Statler, Cleveland, to-day, following a flight from Akron. The dirigible discharged two passengers and took two others aboard for the return trip. The transfer was made on a landing stage built especially on the roof of the hotel.

Record Washington-New York Flight in 84 Minutes

WASHINGTON, May 26—An airplane piloted by Col. Gerald C. Brant and Lieut. Howard Birkett flew 220 miles, from Washington to New York, Saturday in 84 minutes, an average of 157.2 m.p.h., breaking all speed records between these points. The aviators had the advantage of a 60-mile gale behind them. They maintained an altitude of 8000 ft. This trip ended a flight from Houston, Tex., by way of Dayton, Ohio, and Washington. The entire distance of 1725 miles was covered in 994 minutes of actual flying time.

National Gas Engine Assn. to Discuss Bigger Business

CHICAGO, May 26—Bigger business is the general theme of the annual convention of the National Gas Engine Association to be held here at the Sherman hotel, June 2-3. Informal group meetings will consider stationary and oil en-

gines, farm engines, tractor engines, farm lighting plants and accessories. The two-day meeting will be closed by a Victory dinner Tuesday night at which the guest of honor will be W. B. Wilson, Secretary of Labor. He will speak on relations of capital and labor before and after the war. James H. Carter of the National City Bank of New York is the other speaker for the dinner.

150 Manufacturers to Be Represented at Denver

DENVER, May 27—About 100 tractors and 750 farm implements, representing a total of nearly 150 manufacturers, will take part in the Mountain States National Tractor Demonstration, to be held June 9-12 under the auspices of the Denver Tractor Club, Denver Civic and Commercial Association and the civic body's Agricultural and Livestock Bureau. On the 2300-acre demonstration ground, 100 tents will be put up for the exhibiting firms.

Investigation of Rubber Substitute Wanted

WASHINGTON, May 26—Investigation and study of methods for using sage brush and greasewood to produce rubber, alcohol and acetic acid was asked in a bill introduced in Congress by Representative Raker. The bill provides for the appropriation of \$5,000 for making the investigations and tests.

Extend Time of Tax Payments

WASHINGTON, May 26—An extension of time has been allowed to automobile and parts manufacturers and operators of motor truck, freight or express routes for filing return of taxes due under the Revenue Act for the periods from February 25 to March 31, and from April 1 to April 30, 1919, until June 15, 1919. The extension has been granted because of an unavoidable delay in the printing and distribution of the necessary blank forms for making the returns.

The specific sections of the Act referred to are No. 900, which is on the manufacturer's selling price of trucks, passenger cars, motorcycles, accessories and parts, and No. 500, which imposes the tax on transportation of goods by freight or express on motor trucks competing with rail or water.

Delay has also been granted for the filing of returns on admissions to automobile shows for the same reason, until June 15.

Splitdorf Training Foremen

NEWARK, N. J., May 24—The Splitdorf Electrical Co. has organized a group of foremen of its various departments to study modern production methods. The course will last three months and will include training in handling men, a complete study of materials from purchase to final product, a study of the plant, organization, costs, industrial relations, safety and co-operation.

Labor Shortage In Detroit Reduced

Automotive Concerns and Other Agencies Brought Many Here— Fear of Losing Foreign Labor

DETROIT, May 24—The last week has seen a great improvement in labor conditions in Detroit. The shortage, which a month ago was estimated at 50,000 workers, has been decreased to 20,000 by the efforts of all automotive concerns, the United States employment office and other employment agencies, which have brought thousands of men to Detroit. Many of the factories are advertising outside the city for men, while others have field representatives busy in many sections. Hundreds of mechanics and other skilled workers have come in from Buffalo and New York City within the last few days.

Grand Rapids Short 2000 Men

Grand Rapids, a furniture center, is short 2000 men, while Pontiac, Battle Creek, Flint, Jackson, Lansing, Traverse City, Port Huron, Saginaw, and Bay City have all sent in urgent requests for workers at once. The shortage seems to be general in all of the manufacturing cities of the State.

Hundreds of men, both skilled and unskilled, are being brought from the copper countries. Work in the copper fields is slack at this time, many of the mines operating only on a 50 per cent schedule, resulting in a labor surplus there. So many automobile labor representatives from Detroit, Flint, Lansing and other lower Michigan points are working in upper Michigan, employing workers for the industrial centers, that the newspapers of that section are voicing a protest. The press is urging the workers not to be stampeded because there is a little lull in the copper industry, following a very high pressure in production because of war needs. They declare that with the signing of peace terms a great boom is due to hit that section.

Workers Brought from Other Cities

Factories bringing the men in from outside find this method very costly and sometimes without fair results. One plant recently brought 300 workers to Detroit from Chicago and nearby points. The men were told to report for work at a certain time, but out of the 300 only 75 appeared. There are many instances of this sort. Pontiac recently imported 400 workers, 320 of whom left town within a week. The great reason for a laboring man leaving is the living condition. He finds homes unobtainable, rents excessive and food prices extravagant. If Detroit and neighboring industrial towns hope to solve the present shortage by bringing in men from the outside, they must first solve the housing and living problems.

Common labor in Detroit is being paid from 50 cents to 60 cents an hour, while

skilled labor runs from 65 cents up to \$1.25. Tool makers and other highly skilled mechanics are working on scales ranging from 80 to 90 cents an hour. The minimum day wage for common labor is approximately \$5, and in some cases more. The skilled employee is averaging between \$35 and \$50 weekly.

One problem causing the employer of labor more or less concern is the exodus of foreign workers and a threatened permanent shortage of common labor. In the last 4 months 2700 Detroit aliens have left for their native lands. Between 600 and 700 are applying monthly at an emigration office for passports. If this exodus of aliens continues, and there is every indication that the movement is spreading, Detroit alone is going to lose between 10,000 and 12,000 workers within the next few months. Emigration restrictions are rather rigid at present, owing to the continued enforcement of war rulings, but with the declaration of peace there will be a relaxation of many emigration laws, and hundreds of men barred because of technicalities at present will then be permitted to leave.

Few Germans Apply for Passports

The greatest percentage of those desiring to return are Italians, Belgians, Russians, Serbians, Austrians, and French. The Austrian, while clamoring for passports, is held up, except in rare cases, because he is still an alien enemy. Few Germans have applied for passports because they know they will be refused.

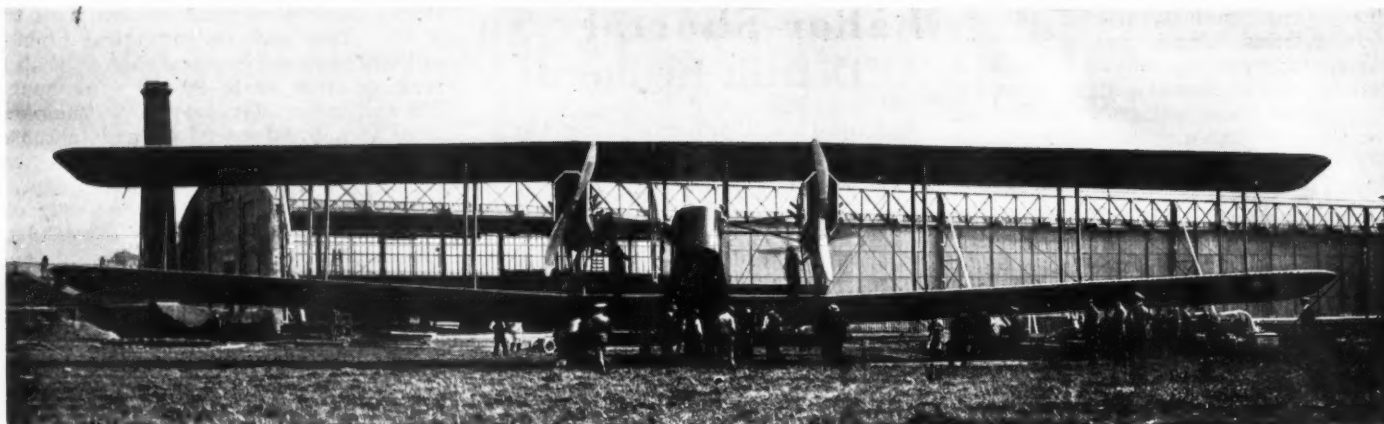
Employers here are closely watching legislative developments at Washington regarding immigration. It is feared that Congress may decide to bar newcomers, which manufacturers regard as serious, taken in connection with the tendency on the part of many European countries to keep workers at home.

Employment Conditions Improve

WASHINGTON, May 23—Reports received from the U. S. Employment Service for the week ended May 17 show an improvement in unemployment conditions. Reports from 87 cities show 39 reporting a surplus as compared with 42 cities reporting a surplus the week previous. Fifteen cities report a labor shortage.

New York reported 126,000 surplus, Cleveland 30,000 and Pittsburgh, 20,000. The Middle Atlantic and New England states report labor surpluses. Cleveland, Youngstown, Cincinnati, and Dayton report unemployment, and Akron reports a shortage.

There is a shortage of labor throughout the South, chiefly in the agricultural district. Los Angeles reports 5600 unemployed, San Francisco, 2000 and Oakland a shortage of 350. Conditions in the Northwest are good, with a shortage of labor reported from all cities. The aggregate surplus of labor shortage of the country of 310,000 is not a serious total and is considered close to the normal.



The Handley-Page airplane, now at Newfoundland in preparation for a transatlantic flight

Rubber Exports for February from Brazil and Peru

WASHINGTON, May 28—The total exports of crude rubber from Para and Manaos, Brazil, and Iquitos, Peru, during the month of February, 1919, amount-

ed to 9,242,309 lb. compared with 6,587,710 lb. for the same month in 1918. Shipments to the United States aggregated 4,434,206 lb. and to Europe 4,808,103 lb. compared with 3,453,272 lb. and 3,134,438 lb., respectively, last year.

The several grades of rubber are shown in the following table:

	From Para		From Manaos		From Iquitos	
	To United States	To Europe	To United States	To Europe	To United States	To Europe
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Fine	634,075	1,863,401	1,274,344	1,570,468	.....	317,444
Medium	111,422	38,147	585,247	122,965	.....	4,256
Coarse	334,319	98,152	821,488	152,251	.....	14,521
Caucho	189,533	348,617	439,686	242,817	44,092	34,064
Total	1,269,349	2,348,317	3,120,765	2,089,501	44,092	370,285

Foreign Trade Opportunities

WASHINGTON, May 27—The Bureau of Foreign and Domestic Commerce has received requests for cars and parts, airplanes and parts, tractors, motorcycles, and accessories agencies of business from individuals and companies in foreign countries. For further information address the Bureau of Foreign and Domestic Commerce, Department of Commerce, and specify the Foreign Trade Opportunity number.

Norway—Cars and supplies. Quotations should be f. o. b. New York. Terms, cash against documents at destination. No. 29403.

New Zealand—Cars, accessories, trucks; electric trucks, $\frac{1}{2}$ to 7-ton; tractors. No. 29420.

Uruguay—Cars and motorcycles. No. 29423.

Switzerland—Cars, bicycles and pneumatic tires. Correspondence may be in English. No. 29434.

Italy—Trucks, 5- to 7-ton, heavy construction. High grade passenger cars. Correspondence should be in Italian or French. No. 29440.

Brazil—Rubber tires. Correspondence may be in English. No. 29443.

France—Tractors. Terms cash. Correspondence in French. No. 29448.

Spain—Cars. Correspondence in Spanish. No. 29449.

Italy—Cars, chassis, wheels, tires, etc., accessories and supplies. No. 29456.

Denmark—Cars for Poland and Scandinavian countries. No. 29470.

Norwegian—Cars, motorcycles, accessories for Scandinavian countries. No. 29473.

Australia—Automobile accessories. No. 29481.

Gillett Products to Have Plant

HOWARD CITY, MICH., May 26—The Gillett Motor Products Co., recently organized to make automobile parts, is breaking ground for a new steel and concrete manufacturing building.

E. M. Landis Co. Newly Incorporated

TOLEDO, May 24—The E. M. Landis Co. has been incorporated to take over the plant and business of E. M. Landis at 6 North St. Clair Street, and to manufacture a kerosene carburetor and automobile lock. The officers of the new company are: President, E. M. Landis; vice-president, Eugene Rheinfrank; secretary, C. E. Shanteau; treasurer, A. J. Hilt. The latter two gentlemen are the new members of the firm. The company will also continue to sell and repair gas engines, trucks and farm machinery.

National Tool Becomes Bluebird

ST. LOUIS, May 23—The National Tool & Manufacturing Co., maker of Bluebird products, has changed its name to the Bluebird Manufacturing Co. to more closely identify itself with its products.

India Tire Dividend

India Tire & Rubber Co., Akron, 2 per cent quarterly dividend on common, 1 $\frac{3}{4}$ per cent on preferred, declared payable July 1.

Router to Make Tools

OSHKOSH, WIS., May 26—The Router Mfg. Co. has been organized with a capital stock of \$100,000 to engage in the manufacture of tools, metal goods, hardware, motor car accessories and similar goods. William P. Casey, E. G. Race and James C. Casey appear as incorporators.

To Reintroduce Townsend Highway Commission Bill

WASHINGTON, May 24—The reintroduction of the bill providing for the establishment of a Federal Highway Commission to take over the control of the national highways, the distribution of funds under the Federal Road Aid Act and to co-operate with the state highway departments was forecast by a meeting held here recently by Senator Charles E. Townsend, father of the bill, with members of the automobile and highway industries.

The bill, which takes over the present duties and authority of the Bureau of Public Roads, Department of Agriculture, greatly enlarges the scope and duties of the road authorities.

Senator Townsend is the chairman of the committee on post offices and post roads. He informed the convention here to-day that he plans to again introduce the bill as soon as he can add various amendments and improvements that have been suggested since the last Congress.

Among those present at the meeting were Roy D. Chapin, president of the Hudson Motor Car Co.; W. O. Rutherford, vice-president of B. F. Goodrich Co.; S. N. Williams, president of the Highway Industries Association; Pyke Johnson, representing the National Automobile Chamber of Commerce and the National Automobile Dealers' Association; Windsor T. White, the White Co.; David Ludlum, president of the Autocar Co., and various road officials.

Auto Specialties Foundry in Operation

ST. JOSEPH, MICH., May 26—The first heat in the newly completed foundry of the Auto Specialties Co. was drawn May 17. The new foundry is now in full operation with enough orders ahead to keep it running several months.

Connor Physical Director for Goodyear

AKRON, OHIO, May 26—Edward Connor, former athletic director at Lincoln High School, is now with the Goodyear Tire & Rubber Co. as physical director. He was athletic director at Camp Sherman during the war with the title of major.

Official Decision for Disposal of U. S. Army Vehicles in France

**Manufacturers Oppose Sale of American Cars and Trucks in France
—Dealers and Users Anxious to Buy—Service Stations and Repair Shops to Be Disposed Of**

PARIS, May 10 (Special Correspondence)—An official decision regarding the disposal of the American Army trucks and passenger cars now in France is expected within a few days. At the end of December, 1918, the Army possessed 7575 passenger cars and 32,500 trucks. Only a small number of these is required for the Army of Occupation, and the rest must be disposed of in Europe or returned to America. This week the Liquidation Board prepared a detailed statement of automotive material no longer required by the army and submitted the same to the French Government, which alone has authority to say whether the material shall remain in France or not. It is hoped that the French reply will be received early, as the clearing up of this question will permit the Americans concerned to return home.

The situation is rather peculiar. French automobile manufacturers are bitterly opposed to any American army cars being allowed to remain in France, and are bringing the greatest possible pressure to bear on the Government to force their return to America. They maintain that if it is necessary to sell these vehicles in France, the purchasers should be called upon to pay the 70 per cent import duty which is now in vogue, not on their present value, but on the original value of the cars and trucks.

Dealers and users, on the other hand, are just as earnest in their endeavors to buy this army material. One of the officers of the Liquidation Board said: "Buyers are literally shaking good money in our faces in order to get delivery of these automobiles."

Offers are coming from all quarters and from men with the best financial backing who want to buy in big quantities. No offers can be accepted, however, until the French Government decision has been rendered as to the conditions under which the material shall be disposed of.

It is stated that the Army has neither Dodges nor Fords for sale, all those now in hand being required for the Army of Occupation. The only other car of which large numbers exist in France is the Cadillac; but while this has an excellent reputation, it is too powerful a car and has too high a gas consumption to suit the average purchaser of used cars in France.

Some of the American army vehicles have already been sold to Allies other than France, who are in urgent need of them. A number of trucks has gone to Roumania, Serbia and Belgium. In addition, the Reconstruction Department of the French Government has taken for its

own use some American army trucks.

When these purchases have been made, the officers of the Liquidation Board have insisted on sufficient spare parts being taken to keep the vehicles in efficient service for at least 6 months. This has been done in an unofficial manner in order to protect the interests of the American manufacturer. Nothing could be more disastrous to the reputation of the American automotive industry than to allow trucks to go to foreign countries without any means of maintenance.

In addition to the vehicles, there are large service depots and repair shops to be disposed of. The most important of these is the Reconstruction Park at Verneuil. This place has big machine shops and immense stocks of spares, including 146,000 solid tires. Owing to the shortage of buildings, these tires had to spend the winter out of doors without protection and have suffered a little in consequence. Probably they will be sold with the trucks, for they are inch sizes and could not be used on European vehicles.

Numerous rumors have been afloat regarding the disposal of the Verneuil shops. One of the most persistent is to the effect that the White Co. had an option on the entire place. Inquiries at headquarters show that while the White people are interested, no option has been given to them.

New British Engine Combines Internal Combustion and Steam Principles

LONDON, May 27—A new design of liquid fuel engine, for which a thermal efficiency higher than that of the Diesel is claimed, was described in a paper before the Society of Arts yesterday afternoon. It is the invention of William Joseph Still, who spent the past eight years on its development.

With the ordinary internal combustion engine a greater amount of heat than is converted into useful work passes into the cooling jacket and is dissipated by the radiator. Still recovers some of this heat by making the cylinder jacket into a steam boiler and using the steam generated therein in the same cylinder in which the combustible charge is expanded, but at the opposite end of the piston. The engine is thus double-acting and, inasmuch as there is always a store of energy in the steam and hot water of the boiler, the engine cannot be stalled by temporary small overloads.

It appears that the engine is intended mainly for marine propulsion where the use of large units would increase the importance of any saving in fuel and minimize the objection to increased compli-

cation of plant. It is claimed that a marine propulsion set weighs 20 per cent less than a geared steam turbine plant, and uses 2000 tons less fuel for a double journey lasting 1000 hours, this comparison being based evidently on a vessel of given tonnage and speed.

C. C. Hanch Returns

NEW YORK, May 28—C. C. Hanch, secretary of the National Automobile Chamber of Commerce, returned Saturday from a 4 months' investigating trip in European countries. Mr. Hanch is engaged in preparing reports of his investigations abroad.

Schwab Elected President of Adams-Williams

NEW YORK, May 27—F. C. Schwab, who resigned as president of the Adams-Williams Manufacturing Corp. to enter government service, was re-elected to that position at a special meeting of the directors of the company. S. H. Crittenden, who also returned from service recently, was elected vice-president. Leo W. Schwab was re-elected secretary and treasurer. Plans have been completed to enlarge factory space and increase production this year.

Wright-Fisher Engineering Co. Formed

DETROIT, May 24—The Wright-Fisher Engineering Co. has been formed here by James A. Wright, W. Ruben Fisher, W. E. Jominy, Albert Harwith, William J. Kurth and L. F. Merritt, all of whom were engaged until recently in the Bureau of Aircraft production. The company will engage in the designing of tools, dies, jigs, fixtures, special machinery, automatic machinery, heat treating equipment, etc.

Increased Production for Marshall Starter

ADRIAN, MICH., May 26—The Adrian Castings Co. is increasing its working force and the output of the Marshall automobile starter. The Marshall starter is the invention of Hal Marshall of this city, and was manufactured for over a year by the Page Steel & Wire Co. before it was taken over by the Adrian Castings Co. The latter is preparing to produce 200 starters per day.

John Bohnet to Make Truck Bodies

LANSING, May 26—The John Bohnet Co. has increased its capitalization \$100,000. The company will enter the truck body field, making a specialty of hearse, delivery and ambulance bodies.

Rubber Association to Study Taxes

AKRON, May 26—The Rubber Association of America has appointed a committee of seven to make a study of the new federal tax on tires, tubes and accessories. Among those on the committee are F. C. Van Cleef of the B. F. Goodrich Co.; B. M. Robinson, Firestone Tire & Rubber Co.; and C. L. Landon of the Goodyear Tire & Rubber Co.

New members of the association just admitted include H. J. Adams, C. R. Quine, Akron Equipment Co.; T. M. Gregory, Jr., M. D. Kuhlke Machine Co.; John Hadfield, Lincoln Rubber Co.; Leo Meyer, A. P. Whetlen and F. E. Holcomb of the J. K. Williams Foundry & Machine Co.; Paul E. Collette of the Oak Rubber Co., and Joe S. Benner of the Electric Rubber Reclaiming Co.

N. A. C. C. Meetings to Discuss Problems of Industry

NEW YORK, May 26—The National Automobile Chamber of Commerce has arranged a number of special meetings to be held at the general headquarters in New York during the week of June 2, to deal with problems arising in the industry. There will also be meetings at Washington.

Following is the schedule of meetings:

- June 2, 10 a. m., Washington, D. C.—Export Committee, J. Walter Drake, chairman, for conference with officials of Department of State and Department of Commerce on foreign trade limitations.
- June 3, 10 a. m., Washington, D. C.—Meeting of Tax Committee in connection with elimination of taxes on cars, trucks and parts.
- June 4, 10 a. m., New York Headquarters—Directors' meeting.
- June 4, 2 p. m., New York Headquarters—Meeting of Truck Committee, Windsor T. White, chairman.
- June 5, 10 a. m., New York Headquarters—Annual meeting of members.
- June 5, 1:30 p. m., New York Headquarters—Regular meeting of truck manufacturers' members of N. A. C. C.
- June 6, 10 a. m.—Meeting of export managers, N. A. C. C., New York Headquarters.

Highways Committee to Study Short Hauls

WASHINGTON, May 26—The Highways Transport Committee, Council of National Defense, will make an intensive study of short haul problems at Boston, New York, Philadelphia, Pittsburgh, Baltimore, Washington, Atlanta, New Orleans, St. Louis, Chicago, Detroit, Cleveland, Omaha, Denver, Dallas, San Francisco, Los Angeles, Portland and St. Paul. The committee asks the co-operation of all manufacturers and dealers so it may obtain the maximum amount of data. Any information relative to the names and addresses of operators, number and capacities of trucks in use, routes and schedules and rates with copy of the tariff when it is available is desired. Such information should be sent directly to the Highways Transport Committee, Council of National Defense, Washington, D. C.

Haynes to Increase Capacity

KOKOMO, IND., May 26—The capacity output of the Haynes Automobile Co. will be increased to 15,000 cars annually, according to plans which were decided upon at a recent meeting of the directors of the company. To make this expansion possible the directors voted to construct a large new factory building and a forge shop and to increase the capital stock from \$3,500,000 to \$5,000,000.

A. G. Seiberling was elected second vice-president. He will continue as gen-

Suggestions Asked as to Form of Census of Automotive Manufactures

Tentative Form for General and Supplemental Information—Bureau of Census Anxious for Suggestions and Criticisms

WASHINGTON, May 24—A survey of the manufactures of 1919 will be taken by the Bureau of Census, Department of Commerce, in connection with the next census. A blank form has been prepared for both general and supplemental information, the latter including the kind, quantity and value of manufactured product, and will be mailed to the manufacturers of the automotive industry in December of this year.

The form which is presented herewith is tentative and subject to revision, and the Bureau of Census will welcome every suggestion from the industry that will be helpful to a better presentation of the statistics and which will be in harmony with the bookkeeping methods of the manufacturers.

All recommendations and criticisms may be addressed directly to the Chief Statistician for Manufactures, Bureau of The Census, Department of Commerce, Washington, D. C.

Confidential

[NN3-457]

8-4338

DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
Sam. L. Rogers, Director

CENSUS OF MANUFACTURES, 1919
Eugene F. Hartley, Chief Statistician for Manufactures

AUTOMOTIVES
(INCLUDING TRUCKS AND TRACTORS)
SUPPLEMENTAL SCHEDULE

NAME OF ESTABLISHMENT.....

NAME OF OWNER.....

LOCATION OF (State..... County.....

FACTORY { Post office..... Street and No.....

1. PRODUCTS: Give the number and selling value or price at the factory, and account for all products and by-products manufactured during the year (whether sold or not). If the establishment makes automobiles using different kinds of power, give the number and value of each kind separately. Establishments manufacturing motorcycles and bicycles, carriages and wagons, or engines, should report such products on the supplemental schedule for these industries.

The total value of products in this schedule must agree with the total in the General Schedule.

Kind	INTERNAL COMBUSTION ENGINES		Electric	Steam	Value
	Gasoline	Other*			
	Number	Number	Number	Number	
Passenger vehicles:					
Open:					
Roadsters.....					
Runabouts.....					
Touring.....					
Closed.....					
Other varieties (specify):.....					
Public conveyances:					
Cabs.....					
Omnibuses, sightseeing wagons, etc.....					
Government, municipal, etc.:					
Ambulances.....					
Fire department apparatus (specify):.....					
Mail delivery.....					
Tanks (specify):.....					
Patrol wagons.....					
Other (specify):.....					

*Name kind: Alcohol, naphtha, kerosene, Natolite, Liberty, etc.

Reverse of sheet on next page

eral manager. March Haynes, son of Elwood Haynes, was chosen assistant treasurer and secretary.

The new factory building will be 4 stories, 500 x 150 ft., adding 300,000 sq. ft. The building will be of fire-proof steel and concrete construction, and will be used for assembling, trimming, painting and storage. It is estimated the normal output of the enlarged

factory will be 50 cars a day. Work on the new building has been started.

"Wilson-Built" Trade-Mark

DETROIT, May 26—The C. R. Wilson Body Co. will trade-mark with the Wilson triangle, containing the words "Wilson-Built," all bodies turned out by its plant.

Reverse Side of Census Questionnaire

Find	INTERNAL COMBUSTION ENGINES		Electric	Steam	Value
	Casoline	Other*			
	Number	Number	Number	Number	
<i>Business vehicles:</i>					
Delivery wagons					
Trucks					
Tractors:					
Farm					
Road					
Other (specify kind):					
Other varieties (specify):					
Chassis					
Trailers	Number				
All other products, including parts, etc.					
Amount received for custom work and repairing					
TOTAL					

*Name kind: Alcohol, naphtha, kerosene, Natolite, Liberty, etc.

2. NUMBER OF MACHINES BY HORSEPOWER RATING: The number of automobiles reported in answer to this inquiry should correspond with the number reported in answer to Inquiry 1.

	Less than 10 H.P.	10, but less than 20 H.P.	20, but less than 30 H.P.	30, but less than 50 H.P.	50, but less than 90 H.P.	90 H.P. or More
<i>Passenger vehicles:</i>						
Open:						
Roadsters						
Runabouts						
Touring						
Closed						
Other						
<i>Public conveyances:</i>						
Cabs						
Omnibuses, sightseeing wagons, etc.						
<i>Government, municipal, etc.:</i>						
Ambulances						
Fire department apparatus						
Mail delivery						
Tanks						
Patrol wagons						
Other						
<i>Business vehicles:</i>						
Delivery wagons						
Trucks						
Tractors:						
Farm						
Road						
Other						
Chassis						

3. REMARKS:

Seventh Foreign Trade Convention Next May

NEW YORK, May 26—The Seventh National Foreign Trade Convention is scheduled to be held in San Francisco on May 12-15, 1920. This will be the first convention of the National Foreign Trade Council to be held on the Pacific coast, and will give special opportunities for the study of export possibilities in South America, China, Japan, Siberia, India, and Australasia.

May Make Licenses Valid Everywhere

WASHINGTON, May 23—A bill has been introduced in Congress to allow anyone qualified to drive an automobile in his residential state to go into another state for business or pleasure without taking out an additional license or tag or paying an additional tax. It is also provided that no owner of an automobile

who has complied with the laws of his own state shall be required to make any additional registration or pay any additional tax to operate an automobile in any other state. The bill, which was presented by Senator Pittman of Nevada, was referred to the Committee on Interstate Commerce.

Government to Standardize Army Tractors

DETROIT, May 26—The Government has established at 1492 Federal Avenue an experimental station for artillery tractors which is in charge of Don Ferguson, consulting engineer. Associated with Mr. Ferguson at the station is William H. Oliver, former chief engineer of the Hyatt Roller Bearing Co. The station will devote its efforts to standardizing the army tractor. There is a large corps of regular army men, enlisted men and civilians.

Grand Central Palace for Commercial Exhibits

NEW YORK, May 24—The Grand Central Palace will be used as a show place for all sorts of manufactured products when it is returned from service as a base hospital on September 30. The Merchants and Manufacturers Exchange will take it over as a commercial exhibit building, and plans for reconstruction of the interior to make it suitable for this purpose are under way. It is a 12-story structure, each floor having approximately 60,000 sq. ft. of floor space.

The four lower floors will continue to be used for annual expositions, and the eight upper floors will be divided among the industries for permanent showings of their products, to be opened beginning Oct. 15. Some of the industries will occupy an entire floor, such as the International Farm Tractor and Implement Exchange, to occupy the sixth floor. Detailed information may be obtained from the Merchants and Manufacturers Exchange, Room 421, 405 Lexington Avenue.

Whitcomb Heads Kenosha Wheel

KENOSH, WIS., May 26—The Kenosha Wheel & Axle Co., organized with a capital stock of \$500,000, as already reported, has completed its organization by the election of the following officers: President, James A. Whitcomb; vice-president, Adolph Epstein; secretary and treasurer, Lloyd E. Wood; directors, Martin P. Winther, F. E. Dunnebacke. Mr. Whitcomb is the owner of the Whitcomb Tool & Machine Co., Kenosha, which merges its business with the new concern. Mr. Wood was associated with the Mitchell Motors Co., Racine. The former plant of the Winther Motor Truck Co., Winthrop Harbor, Ill., has been acquired by the new company and is being equipped for use until a new manufacturing group is built in Kenosha.

Sunbeams Barred From Race

NEW YORK, May 26—The two Sunbeams brought over for the Indianapolis 500-mile race on May 31 by Louis Coatalen, their designer, have been barred from the event because the machines were found to be oversize with a piston displacement greater than that permitted by the American Automobile Association. This means that Dario Resta and Jean Chassagne, who were to have piloted these cars in the 500-mile Victory sweepstakes, have lost their chance to take part.

Discontinue Motor Transport Shipments to A. E. F.

WASHINGTON, May 24—Cables from the A. E. F. have ordered cancellation of all shipments of motor transport corps supplies to France. The supplies now on hand in Europe are sufficient to meet the requirements until evacuation is completed.

\$300 Fee for 7-Ton Trucks Proposed

Charge from \$10 Up Recommended by Massachusetts Legislature Considered Prohibitive

BOSTON, May 26—The Roads and Bridges Committee of the Massachusetts Legislature has recommended registration fees for trucks that are regarded as practically prohibitive for the use of larger trucks. The report begins with \$10 for 1-ton trucks and is increased to \$50 for 4-tons, \$200 for 6-tons and \$300 for 7-tons.

The present fees are \$5 for the 1-ton truck, rising gradually to \$23 for 7-ton trucks. When the Truck Dealers' Committee was asked for suggestions, they recommended fees ranging from \$10 for a 1-ton truck to \$46 for a 7-ton. The Massachusetts Highway Commission outlined a scale of fees ranging from \$10 for a ½-ton truck and \$20 for a 1-ton to \$260 for a 7-ton truck.

The controversy over the fees has had a material influence in retarding truck sales. Users now decline to buy heavy trucks until this question is settled.

The truck owners protested any increase, basing their objection on the fact that they pay heavy personal property taxes as well as registration fees. Truck owners did not at any time admit that the registration fees should be increased. The bill as drafted by the committee has been referred to the Committee on Ways and Means and the opponents plan that if they do not get a report to their liking in the committee they will carry it to the floor of the House.

One element entering into the present controversy is the fact that the Highway Commission is to be reorganized and this may change the general status of the proposed legislation.

Complete Airplanes Made by Mexican Government

WASHINGTON, May 27—The Mexican Government has established aviation shops, together with an aviation school, on the outskirts of Mexico City. Both the school and shops were opened in January under direction of the War Department. There are 40 airplanes in Mexico, 10 of which were constructed at the shops and the others assembled there.

The shops are equipped for the manufacture of complete planes, and the present capacity is placed at one airplane and six propellers per week, with facilities for increasing the propeller capacity to 40 per week. At first European and American engines were used entirely, but reports now indicate that engines are being manufactured at the shops. This engine, known as the Aztatl motor, is described as being 80-hp., 120 r.p.m., and functions perfectly at 2500 meters. Work is also being done, according to reliable reports, on an engine of 150 to 180 hp. Propellers of good quality are manufactured from mahogany and other native

wood. The anahuac propeller, made of mahogany and "pople," functions perfectly at 2500 meters. It reached 1200 r.p.m. Steps have been taken toward the construction of bombs for airplanes and of bombing planes. The Government expects to build armored bombing machines this year.

Goliath Attains Record Height of 16,730 Feet

PARIS, May 10 (Special Correspondence)—Henry Farman's biplane, the Goliath, which for the past 3 months has been running between Paris and London, and Paris and Brussels, has established a height record of 16,730 feet with 25 persons aboard. This altitude was attained in 1 hr. 15 min.; the descent occupied 25 min. The Goliath, with its load, weighed over 4 tons, made up as follows:

	Lb.
25 passengers	3582
Airplane	4400
Gasoline	770
Oil	66
	8818

The Goliath is fitted with two Salmson star engines developing a total of 550 hp. During the record flight the engines were never run at their full power, in order not to subject the plane to undue strains. It is asserted that the pilot never made use of more than 360 hp.

This biplane has made two previous attempts at height records. On April 1 it attained an altitude of 20,670 ft., with 5 persons aboard, in 65 min., and 3 days later it rose to 20,340 ft. in 65 min. with 14 persons aboard.

Young Industries Gets Patterson Plant

HOLLY, MICH., May 23—The L. A. Young Industries, Inc., Detroit, at a receiver's sale, purchased the plant of the Patterson Manufacturing Co. here, and will start operating immediately. The company will make cushion springs for automobiles and 250 men will be employed. Plans for the building of 50 homes for the new workers are also under way.

New Automobile Signal Co.

GRAND RAPIDS, MICH., May 21—The Automobile Signal Co. has been formed with a \$400,000 capital. Of the capital stock, \$100,000 is preferred stock subject to redemption at par April 1, 1949, and the holder is entitled to an 8 per cent dividend. It is provided that the corporation may redeem the preferred stock on any dividend date at 105 per cent of its par value, plus accrued dividends. None of the common stock has been subscribed, but all of the common stock has been paid in through the receipt of United States and Canadian patents and the trade-mark registered in the U. S. patent office. The stockholders are Joseph Renihan, V. I. Cilley, and I. J. Cilley.

Program Outline for Pan American Meeting

Aviation Up for Discussion—All Aspects of Pan-American Trade to Be Considered

WASHINGTON, May 26—The Pan-American Commercial Conference will open here on June 2 at 4 p. m. instead of June 3 at 10 a. m. as was first planned. The change has been made to allow certain speakers to attend who will be absent at the later days.

Aviation will be one of the topics discussed, particularly in its relation to Pan-American commerce.

Beginning June 3 at 9.30 a. m., and continuing thereafter with morning, afternoon and evening sessions, the conference will take up the following principal topics:

- I—General Review of Pan-American Export and Import Situation.
- II—Trading Methods for Both Exports and Imports, subdivided into:
 - (a) Business ethics,
 - (b) Merchandising,
 - (c) Commission service and direct trade,
 - (d) Export and import combinations.
- III—Shipping and Other Transportation, subdivided into:
 - (a) Steamship lines and ships,
 - (b) Other transportation, including airplanes as an aid to commerce.
- IV—Financing Trade; Investments; Loans, Etc., subdivided into:
 - (a) Banking,
 - (b) Credits,
 - (c) Investments, loans, etc.,
 - (d) Government aid to commerce, including the War Finance Corporation.
- V—Engineering Aids to Commerce, subdivided into:
 - (a) Railways and highways,
 - (b) Waterways and harbors,
 - (c) Irrigation,
 - (d) Sanitation.
- VI—Parcel Post, Trade Regulations, Etc., subdivided into:
 - (a) Parcel post,
 - (b) Patents and trade marks,
 - (c) Consular and other trade regulations,
 - (d) Packing and insurance.
- VII—Commercial Intelligence, subdivided into:
 - (a) Advertising and publicity,
 - (b) Newspapers and periodicals.
- VIII—Educational and Social Auxiliaries to Commerce, subdivided into:
 - (a) Vocational training,
 - (b) Language study,
 - (c) Exchange of students and professors,
 - (d) General influences.

The governors of the various states have been invited to attend or send representatives. The conference will open on Monday afternoon with addresses by Vice-President Marshall, the Ambassador of Mexico, the Minister of Bolivia and others. Speakers on various topics at the following sessions include William C. Redfield, Secretary of Commerce; Dr. Carlos de Cespedes, Minister of Cuba; Dr. L. S. Rowe, Assistant Secretary of the Treasury; Don Julio Zamora, Financial Commissioner of Bolivia; Dr. José Santiago Rodriguez, Special Commissioner of Venezuela; Julius G. Lay, Foreign Trade Adviser of the State Department; Francisco J. Yanes, Assistant Director of the Pan-American Union; Don Ernesto Perez, Argentine Consul General of New York, and Dr. Burwell S. Cutler, Chief of the Bureau of Foreign and Domestic Commerce.

Wireless Telephony at S. A. E. Meeting

Connection Will Be Made Between Boat on Lake and Lecture Room—450 Reserved

NEW YORK, May 28—A demonstration and lecture on wireless telephony will be the feature on Tuesday evening, June 24, at the Summer Meeting of the Society of Automotive Engineers at Ottawa Beach. E. H. Colpitts, of the Western Electric Co., who has been identified with the development of wireless telephony, and who spent many months in France during 1918 on radio transmission, is preparing to give a combined lecture and demonstration that will occupy an hour to an hour and a half.

A high speed motor boat is being fitted with apparatus and the lecture room at Ottawa Beach will also be equipped so that all of those attending the lecture can listen to the conversation by wireless telephony between the demonstrator and the operator on the motorboat, which will be several miles out on Lake Michigan. In addition Mr. Colpitts will explain wireless telephony by means of many illustrations, still pictures, and various demonstrating apparatus.

One of the sessions will be given over to members of army and navy departments, who will tell to members of the S. A. E. what their plans are with regard to the future, so that industry

may be kept as closely in touch with government as possible. Already the Aircraft Department, Ordnance Department and Motor Transport Departments have agreed to send representatives to Ottawa Beach for this express purpose. Not only will they outline the program of these departments but will answer questions.

The forenoon, given over to the future passenger car, promises to be of unusual interest. Already seven or eight leading engineers have prepared their views on the future passenger car, and it is expected that upwards of 50 or more engineers will express their opinions on this subject during the session given over to it.

It is very probable that an exhibit of captured German trucks will be one of the features of the meeting. These trucks are already on their way to America and it is expected that a portion of them will be on hand at Ottawa Beach.

Four hundred and fifty reservations have been made at the hotel for the entire 5 days of the meeting. Reservations are coming in at the rate of practically 30 per day.

Advance Pump Additions

BATTLE CREEK, May 26—The Advance Pump & Compressor Co., Battle Creek, is adding to its plant and equipment. Building additions and installations of machinery aggregating \$75,000 in value are being completed.

Overland Strikers Resume Work

Thirty Departments Opened Monday—Number of Men Back Is Disputed

TOLEDO, OHIO, May 27—The Willys-Overland Co. resumed operation in 30 of its departments yesterday. Thirty more departments opened to-day and to-morrow will see the remaining units in operation. In spite of the strike, which has been in progress for 3 weeks and the fact that the plant was heavily picketed by the strikers, the returned workers were not molested. There was no disorder. All gates to the plant were heavily guarded by police, special deputies, Overland guards and United States troops. Two hundred soldiers, members of the 135th Field Artillery and 147th Infantry, under command of Colonel Loyd W. Howard, are on duty.

Car Production Curtailed

No cars were made yesterday, the departments in operation producing parts only, and it is doubtful if the company will get back into production this week. Vice-President Clarence A. Earl was unable to give an estimate of the number of men returning to their posts. From the number of men still out, it is apparent that the trouble is far from settled, and it will take the company 2 or 3 weeks to get back into reasonable production. Practically all the machinists are holding out.

Workers Not Interfered With

When the company closed its doors 2 weeks ago it was producing 435 cars daily. In a statement to AUTOMOTIVE INDUSTRIES, Mr. Earl said: "We are very much pleased with the result of the first 2 days' operation. I cannot tell how many men have returned. Workmen who quit because of fear have been given ample protection."

Joseph D. LaDonde, head of the workers' wage committee, said: "Not over 800 men went to work Monday. Of this number about 350 were foremen and assistant foremen. No attempt was made by pickets or union supervisors to interfere with the returning workers."

Henry Ford & Son Resume

DEARBORN, MICH., May 28—Henry Ford & Son, which closed for inventory the first of the month, has resumed operations. Completed tractors will be coming through again in quantity by June 1.

Wright-Martin Merging With International Motors

NEW BRUNSWICK, N. J., May 27—The Wright-Martin Aircraft Corp. and the International Motors Corp. are formulating plans by which the two companies will be merged. All plans are tentative and no details can be obtained.

Exports by Countries for April, 1919, and Nine Months Ending April, 1919

	Cars		Trucks		Cars		Trucks	
	No.	Value	No.	Value	No.	Value	No.	Value
Denmark	115	\$169,514	273	\$432,242	273	\$432,242	3,356	\$14,098,262
France	4	18,900	682	930,687	682	930,687	.....	.....
Norway	93	161,483	327	639,006	327	639,006	.....	.....
Russia in Europe .....	.....	.....	6	6,605	6	6,605	.....	.....
Spain	114	90,450	650	850,988	650	850,988	.....	.....
United Kingdom	120	158,392	251	344,960	251	344,960	869	2,531,035
Canada	1,401	1,224,294	168	2,470,454	3,790	3,491,431	1,656	3,023,656
Mexico	304	225,574	.....	.....	1,639	1,565,580	.....	.....
Cuba	224	279,538	87	1,701,695	1,550	2,235,117	543	1,058,805
Argentina	57	61,135	.....	.....	1,267	1,564,574	40	96,363
Chile	81	157,725	.....	.....	1,007	1,568,961	.....	.....
Uruguay	293	298,664	.....	.....	919	902,159	.....	.....
British India	140	168,464	.....	.....	251	312,962	.....	.....
Dutch East Indies	528	659,999	.....	.....	1,915	2,491,733	.....	.....
Russia in Asia .....	.....	.....	1	3,800	6	13,634	16	22,000
Australia	134	133,911	.....	.....	2,729	2,598,318	.....	.....
New Zealand	298	330,223	.....	.....	1,296	1,327,175	.....	.....
Philippine Islands	215	225,615	.....	.....	1,261	1,402,430	.....	.....
Br. So. Africa	19	16,883	.....	.....	922	961,614	.....	.....
Other countries	1,086	1,123,159	522	8,690,408	7,421	8,365,903	3,484	5,954,611
Total	5,226	\$5,503,923	1,029	\$13,928,950	28,192	\$32,006,079	9,964	\$26,784,736

Exports of Automotive Equipment for April and Nine Previous Months

	1918		1919		1918		1919	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes .....	.....	.....	.....	.....	18	\$192,620	43	\$577,600
Airplane Parts .....	.....	.....	.....	.....	.....	6,496,796	.....	11,185,973
Commercial Cars	657	6,401,160	1,029	2,352,647	10,512	27,900,334	9,973	26,784,736
Motorcycles	881	192,067	1,955	505,691	8,809	1,931,634	8,692	2,135,933
Passenger Cars	4,534	3,962,255	5,226	5,503,923	46,413	39,615,513	28,192	32,006,079
Parts, not including engines and tires .....	.....	2,895,600	.....	3,866,237	.....	26,878,157	.....	28,845,103
Totals	6,072	\$13,987,888	8,210	\$13,228,372	65,752	\$103,015,054	46,900	\$101,535,424

	1918		1919		1918		1919	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobile, gas	2,738	\$384,771	3,257	\$487,089	31,253	\$3,664,992	20,456	\$3,201,929
Marine, gas	654	217,452	1,232	624,966	6,405	2,121,668	6,135	3,279,469
Stationary, gas	3,199	285,732	2,674	368,040	22,440	2,501,908	19,450	2,788,656
Tractor, gas	3,788	3,916,555	2,305	2,138,049	19,539	19,724,593	17,816	19,302,722
Total	10,379	\$4,804,510	9,468	\$3,618,144	79,637	\$28,013,161	63,857	\$28,572,776

General Motors Officers Visit Michigan Plants

DETROIT, May 26—A delegation of officers and directors of the General Motors Corp. and du Pont de Nemours Co. visited this city last week for an inspection of the corporation's plants in Michigan. The executives, headed by President W. C. Durant, spent one day each in Detroit, Pontiac, Saginaw, Flint, and Lansing.

The visiting executives included Irene du Pont, Felix du Pont, Eugene du Pont, E. E. du Pont, H. F. du Pont, J. A. Haskell, H. G. Haskell, William Coyne, H. F. Brown, F. Donaldson Brown, F. W. Pickard, F. G. Tolman, H. F. Pierce, J. J. Raskob.

Horace Mills, director of sales of the Stroh Casting Co., Detroit, has resigned and will be associated with Walter O. Adams in a new enterprise. E. Betts, foundry engineer, has also resigned to become interested in the same project.

Benjamin Briscoe, president of the Briscoe Motor Corp., Kalamazoo, Mich., who is also a Lieutenant-Commander in the U. S. Navy, has just been made a Commander and has been taken from the retired list. He has been ordered to Great Lakes Naval Training Station and will again assume active duties.

J. G. Cashin, for four years with the Curtis Co., Detroit, has been made advertising manager of the Standard Motor Truck Co., Detroit.

George Ostendorf, formerly with the Tropical Paint & Oil Co., Cleveland, has joined the sales force of the Hilo Varnish Co., Brooklyn, N. Y., and will make his headquarters in Cleveland.

W. D. Hopson, who for three years represented the Studebaker Corp. of America as service supervisor in the Orient, has been appointed service representative for the General Motors Export Co. in the Far East. He expects to sail for Shanghai about June 15.

J. A. Teach, contracting, mechanical and structural engineer, is now at the New York office of the Minneapolis Steel & Machinery Co. C. W. Hadden continues as export manager.

T. C. Luce and W. Storrie have been added to the engineering department of the Apco Manufacturing Co., Providence. Mr. Luce for the past five years has been on the engineering force of the American Chain Co. Mr. Storrie was one of the early designers of Argyll cars, made in Glasgow, Scotland.

Raymond G. Lambe, formerly on the purchasing staff of the Ford Motor Co., has been appointed sales manager of the Detroit Reamer Salvage Co.

Men of the Industry

Changes in Personnel and Position

Mahoney New Buda Sales Manager

HARVEY, ILL., May 24—J. P. Mahoney, for three years general purchasing agent of the Buda Co., has been appointed sales manager to succeed Lon R. Smith, who resigned.

Fred C. Young will be in charge of the Cleveland office of the Union Drawn Steel Co., Beaver Falls, Pa., which was recently opened at 608-610 Rockefeller Building.

Donald P. Hess, director of the Priorities Section of the Motors and Vehicles Division of the War Department during hostilities, has been appointed assistant factory manager of the Timken Roller Bearing Co., Canton, Ohio.

A. H. Jessup, a captain in the Sanitary Corps with the 77th Division, has received his discharge from service, and has returned as plant engineer to the Lakeside Forge Co., Erie, Pa.

A. J. Collins has been appointed advertising manager of the Ajax Rubber Co., New York. He was formerly assistant to the publicity manager of the Atlas Portland Cement Co.

A. R. Ruggles, vice-president and production manager of the Panhard Motors Co., Grand Haven, Mich., has resigned, due to ill health.

E. P. Barnett has been appointed sales manager in the Milwaukee territory for the Titan Truck Co., Milwaukee. He was formerly connected with the Sterling Motor Truck Co. and M. D. Newald & Co., Stewart distributors at Milwaukee.

E. Leidich has been appointed foreign sales manager of the Columbia Motors Co., Detroit. He was formerly in a similar position with the Paige company.

William J. Moore, who has been director of purchases at the Fordson Tractor Co. almost from the time the company was organized, has resigned. His future plans are not known.

Charles A. Sinclair, assistant secretary and treasurer of the Anderson Forge & Machine Co., Detroit, died suddenly of pneumonia on May 22. He was 45 years old and was connected with the company for 8 years. He leaves a widow and two sons.

Pope to Represent S. A. E. at Engineering Conference

NEW YORK, May 23—At the May meeting of the Society of Automotive Engineers, Metropolitan Section, held at the Automobile Club of America last night, N. B. Pope was appointed a delegate to a conference of representatives of New York sections of engineering societies. For the nominating committee of the S. A. E., the Metropolitan Section appointed C. F. Scott as first choice and H. W. Slauson as alternate.

C. F. Scott spoke on preparations for the summer meeting at Ottawa Beach, Mich., and urged everyone to attend. The paper of the evening, on Four Wheel Drive Trucks, is abstracted elsewhere in this issue.

Frank H. Dewey, for some time truck engineer for the Packard Motor Car Co., Detroit, is now associated with the Horizontal Hydraulic Hoist Co., Milwaukee, as sales engineer, and has opened a Detroit office for the company.

Bruce E. Anderson, formerly with the Ideal Engine Co., has been appointed general manager of the Lansing Body Co., Lansing, succeeding Frank Thoman, who has retired from the managership, but retains his position on the board of directors.

Glenn H. Harker, who spent 21 months in France, has now become manager of the Falls Tire Co., Detroit. He was connected with the Federal Tire & Rubber Co. when he enlisted.

Harry S. Finkstadt, who enlisted in the aviation corps shortly after the United States' entry into the war, has recently been honorably discharged and returned to Detroit as western sales agent of the Carbon Steel Co., Pittsburgh.

L. R. Scafe, who was comptroller of the Dayton-Wright Airplane Co., Dayton, is secretary and treasurer of the American Finance Investment Co. of that city.

John H. Hertzler, who was with J. S. Bretz, has been appointed sales manager of the Cleveland Worm Gear Co., Cleveland.

Miss Jelliffe Leaves S. C. Johnson & Son

RACINE, WIS., May 23—Miss Sarah Jelliffe, who has been advertising manager of the S. C. Johnson & Son Co. for a number of years, is resigning to become connected with the Western Advertising Agency.

Jordan Erecting New Buildings

CLEVELAND, May 26—The Jordan Motor Car Co. has commenced work on several additions to its factory, which include a power plant, assembly plant, office building, japanning plant and engine test building.

M. & S. Now Powrlock

CLEVELAND, May 26—The M. & S. Corp., which recently moved here from Detroit, has changed the name of its product from the M. & S. differential to Powrlock, and has also changed its corporate name to the Powrlock Co. M. T. Walker, formerly vice-president and general manager of the Walker-Weiss Co., is president of the new concern. Other officers are: sales manager, L. O. Haskins; factory manager, R. S. Townsend; chief engineer, R. H. Goodrich. A new plant is in operation which will give increased manufacturing facilities.

Kalamazoo Sheet Metal Co. Organized

KALAMAZOO, May 24—The Kalamazoo Blow Pipe & Sheet Metal Co. is a new concern organized by H. F. Brundage and Harry Baird. It will act as sheet metal engineer and contractor, and render specialist service in installing exhaust and blow piping, heating and ventilating, air drying and cooling systems.

Chicago Pneumatic Tool Coming East

NEW YORK, May 23—The Chicago Pneumatic Tool Co. will put up a 10-story brick building here at 6-8 West 44th Street, and will move its general offices to this city from Chicago.

Buda Establishes Service Companies

HARVEY, ILL., May 24—The Buda Co. will establish Buda engine service companies all over the country. The first will be opened in Los Angeles, San Francisco, Seattle, and possibly Portland, Ore. The establishment of a service company in Kansas City will take care of the Middle West, and New York City will be the eastern headquarters.

International Corp. Groups Subsidiaries Under Allied Machinery Co.

NEW YORK, May 23—An increase in the capital stock of the Allied Machinery Co., bringing it up to \$5,000,000, was made necessary by the decision of the American International Corp. to group all its machinery export selling subsidiaries under one head. The Allied Machinery Co. of America will thus become the parent organization of the Allied Machinery Co. de France and the Allied Machinery Co. d'Italia and of the Horne Co., Ltd., of Japan, purchased early in the year by the American International Corp. These companies will, however, retain their corporate entities.

The Allied Machinery Co. of America formed in 1911 was taken over in 1916 by the American International Corp. J. W. Hook is president in general charge of the business. Other officers are: Vice-presidents, F. A. Monroe, in charge of administrative affairs, S. T. Henry, in charge of sales and advertising, and T. G. Nee, who is at present in Japan, in the interests of the Horne Co., Ltd. R. P. Redier is general sales manager with headquarters in Paris.

**Current News of
Factories****Notes of New Plants—
Old Ones Enlarged****The Detroit, a New Assembled Truck**

DETROIT, May 24—Leonard B. Orloff Co., automobile distributor, will assemble a 1-ton truck bearing the name Detroit. The truck will be on exhibition at the Orloff salesrooms, 811-815 Second Avenue.

The truck is assembled almost exclusively of units turned out in local factories. The engine is a Continental model N; the frame is from the Detroit Pressed Steel Co.; the springs from the Detroit Steel Products Co.; the front axle is Timken and the rear, Russel; the clutch and transmission from the Detroit Gear & Machine Co. factories; the radiator is made by the Long Mfg. Co.; the steering is Gemmer; the wheels are made by the Hayes plants; the fenders and hood by the Motor Metal Products.

Kalamazoo Motors Takes Over Lane Truck

KALAMAZOO, MICH., May 23—The Kalamazoo Motors Corp. has been formed with a paid in capital of \$250,000 to take over the business formerly conducted by the Lane Motor Truck Co. The officers of the new company are: President, H. A. Crawford; vice-president, C. J. Johnson; secretary, R. M. Gregory; treasurer, W. B. Milham; chief engineer and production manager, L. W. Coppock. The company has already taken possession of the Lane Motor Truck Co. building. The truck which will be made by the new company will be known as the Kalamazoo, and will come in three sizes, 1½, 2½ and 3½-ton models. The company plans an output of 1000 trucks a year.

Harroun Issues Additional Stock

DETROIT, May 23—The Harroun Motors Corp., because of its inability to secure an adjustment on a war claim of approximately \$700,000, has just issued a call on its stockholders for funds, the basis being the purchase of additional stock at \$5 per share. Lack of operating capital has prevented the Harroun company from getting into passenger car production, and drastic steps to re-finance it are now being taken. A committee representing Kansas City investors, who advanced \$650,000 some time ago, is supervising affairs of the plant at Wayne.

The company, it is explained, exhausted its working capital through government work. The money received from shareholders will be needed in changing to a normal basis. The entire output now in contemplation has been sold to its distributors for five years.

Liberty Building New Plant

DETROIT, May 25—The new factory site for the Liberty Motor Car Co. comprises 12 acres, on which three principal buildings and a power house are being erected. The administration headquarters will front on Charlevoix Avenue, and will be 50 x 200 ft., of brick colonial construction. Production offices and display rooms will be on the first floor, and executive and sales offices on the second. The second building, 60 x 320, immediately behind the first, will include a service, experimental and closed body mounting department. Back of this will be the main assembly building, which is to be 120 x 600 ft., and power house will complete present plans.

Van Dorn to Put Up New Building

CLEVELAND, May 23—The Van Dorn Electric Tool Co. will erect a \$100,000 4-story concrete manufacturing building. It will cover ground space 60 x 100 ft. with a 1-story addition 125 ft. deep.

Briscoe Devices Co. Succeeds Jackson Carbureter

JACKSON, MICH., May 24—The Jackson Carbureter Co., maker of Dave Buick carbureters, will be succeeded by the Briscoe Devices Co., and its product will be known as the Scoe carbureter. Frank Briscoe is president and general manager of the new concern. A. W. McCalmont, formerly with the Jackson Automobile Co. and the Briscoe Motor Co., and more recently an engineering officer in the Air Service in France, will be sales engineer.

KAENJAY Moves to New Jersey

NEW YORK, May 24—The Auto Leather Mfg. Co. has removed its plant and equipment from 21 Warren Street, New York, to a new building in Arlington, N. J. The company manufactures KAENJAY products.

Republic Opens Eastern Office

ALMA, MICH., May 24—The Republic Motor Truck Co., Inc., has opened Eastern headquarters in New York City with J. Martin Van Harlingen as district manager. John Sawan will be associated with Mr. Van Harlingen. He will make his headquarters at Pittsburgh, operating from the New York office.

Airplanes in Stewart Salesroom

BOSTON, May 23—C. E. West, manager of the Stewart Truck Co., has leased ground at Boxford, and six hangars are being erected, each of which will be 190 ft. long, 48 ft. wide and 48 ft. high. This will be used as training grounds for flyers and for an exhibition field. Mr. West has five machines in shipment and five more are to be delivered before June 15. He has one on exhibition in his salesrooms, where he will also keep a stock of parts. The machines are of the Curtiss JN-4 type, each with a 90 hp. engine. They were used by the Canadian government. One sale has been made.

24,199 War Contracts Cancelled

Claims for \$150,000,000 Are Awaiting Examination and Adjustment by War Department

WASHINGTON, May 28—The War Department has cancelled 24,199 contracts to date since the signing of the armistice, of which 15,756 have been finally disposed of by release, supplementary agreement or award. In addition, definite agreements have been reached on 2500 others, and of those remaining all have been taken up by the Claims Board and are in process of examination and verification. A total of \$150,000,000 of claims has not yet been formally presented because of their extent and complexity. These facts about the war contracts were revealed to-day in a report made by Assistant Secretary of War Benedict Crowell to Secretary Newton D. Baker.

It is estimated that the total cost to complete those contracts that have been eliminated would have been \$3,600,000,000, and this figure has been reduced by the termination of the orders to claims amounting to \$700,000,000. Up to date \$153,476,000 has been awarded and \$125,000,000 paid.

Following the passage of the act authorizing payment of informal contracts, and up to May, 17,568 awards were made under the law, including a total of \$38,081,623 to be paid, of which \$33,596,168 has been paid. The total number of claims filed under the act amounts to 2844.

Outlining the methods of settlement, the report states that where performance of a contract was curtailed adjustment was effected by agreement as to the extent of the curtailment, the contractor accepting a reduced order in lieu of the original one, and payments in addition to those for completed articles being only nominal.

Where the contractor made expenditures or commitments on the uncompleted portion of the contract he is reimbursed for the expenditures or commitments with an additional remuneration for the use of his capital and services that did not result in completed articles. In detail this settlement is made according to the following plans:

1. Reimbursement to the contractor for raw materials, direct and indirect, and component parts on hand in an amount not exceeding the requirements for the completion of the contract: Cost plus inward handling charges plus such portion of overhead as is directly applicable, less such sums as may represent the fair agreed value of all or any portion thereof, if the title and possession of the same are retained by the contractor.

2. Reimbursement to the contractor for articles in process, in an amount not exceeding the requirements for the completion of the contract: Cost of raw materials and labor plus such portion of overhead as is directly applicable, less such sums as may represent the fair agreed value of all or any portion thereof, if the title and possession of the same are retained by the contractor.

3. Payment to the contractor of a fair and equitable remuneration (1) for expenses and services of the contractor in connection with the items included in paragraph 1, but not to exceed interest at 6 per cent per annum on the capital invested therein, or, if

the capital was borrowed, interest at the rate paid by the contractor; and (2) for expenses and services of the contractor in connection with the items included in paragraph 2, but not to exceed 10 per cent of the cost thereof.

4. Reimbursement of the contractor for such amounts as are properly paid by him in the adjustment and termination of unperformed sub-contracts and unperformed commitments for supplies which were properly entered into or made in connection with the performance of said original contract.

5. Reimbursement to the contractor for pay rolls and expenses paid or incurred with the approval of the contracting officer, or properly paid or incurred without such approval, for the custody and protection of property since the date of suspension above recited and pending final settlement.

6. Reimbursement to the contractor where special facilities were properly provided in connection with the performance of the original contract, necessity of which was contemplated by the contractor and included in his estimate of cost at the time the original contract was made, of such portion of the cost thereof as would reasonably have been recouped had the uncompleted portion of the original contract been performed.

7. Payment to the contractor of such additional sums, if any, as the Secretary of War may deem necessary fairly and justly to compensate the contractor for expenditures, obligations, and liabilities necessarily incurred, including work, labor, and service necessarily rendered, under the original contract or in preparation for the performance thereof, or under this supplemental agreement.

Explaining the task of settling the huge number of contracts, the Assistant Secretary stated that many contracts involve the history of a vast amount of material, complicated questions of the apportionment of overhead and the determination of the contractor's own obligations on his commitments on his sub-contracts which he has had in turn to curtail by reason of the termination of his contract by the War Department. In some prime contracts the sub-contracts run into the hundreds in number, and each must be verified by the department before settlement is made. Because of this the local bureaus were established in 34 sections of the country to first handle the claims before they were transmitted to Washington.

Racine-Sattley Will Put Up Engine Plant

SPRINGFIELD, ILL., May 24—The Racine-Sattley Co. has purchased land adjacent to its present site and will erect a \$300,000 plant for the construction of gasoline engines from 1½ to 15 horsepower. Employment will be given to 600. It was planned to construct these buildings two years ago, but postponement was forced by the war.

Post Tractor Factory

CLEVELAND, May 15—The Post Tractor Co. has taken a 10-year lease on a structure to be erected as the first unit of its tractor plant. It will be increased in size as business permits.

Detroit Axle Bought by Puritan Machine

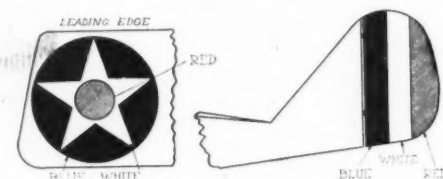
DETROIT, May 23—The entire stock and equipment of the Detroit Axle Co. has been purchased by the Puritan Machine Co.

Tower Truck Enlarging Plant

GREENVILLE, MICH., May 24—The Tower Motor Truck Co. has increased its capitalization from \$200,000 to \$500,000. New buildings will be erected at once to accommodate production increases on both the 2- and 3½-ton models.

New Insignia for U. S. Military Airplane

War and Navy Departments Authorize Change in Emblems for Wing and Rudder



Wing Insignia Rudder Insignia

WASHINGTON, May 24—The distinguishing insignia on American aircraft has been changed by order of the War and Navy Departments and will hereafter be a red circle inside of a white five-pointed star inside of a blue circumscribed circle. The circumference of the inner circle will be tangent to the lines forming a pentagon made by connecting the inner points of the star. The inner circle will be red, that part of the star not covered by the inner circle, white, and that part of the circumscribed circle not covered by either the inner circle or star will be blue.

The insignia is to be placed on the upper and lower surfaces of the upper and lower planes of each wing so the circumference of the circumscribed circle will be tangent to the outer tips of the planes. One point of each star must be pointed directly forward and the diameter of the insignia which can be either painted on or applied by decalcomania transfer, must be 60 in.

The rudder insignia will be three equally wide bands, red, white and blue. Both sides of the rudder, in the rear of the rudder post, will be striped parallel to the vertical axis of the plane, with the blue stripe nearest the rudder post, the white in the center and the red at the tail of the rudder.

Two Companies Under Bates Machine & Tractor Co.

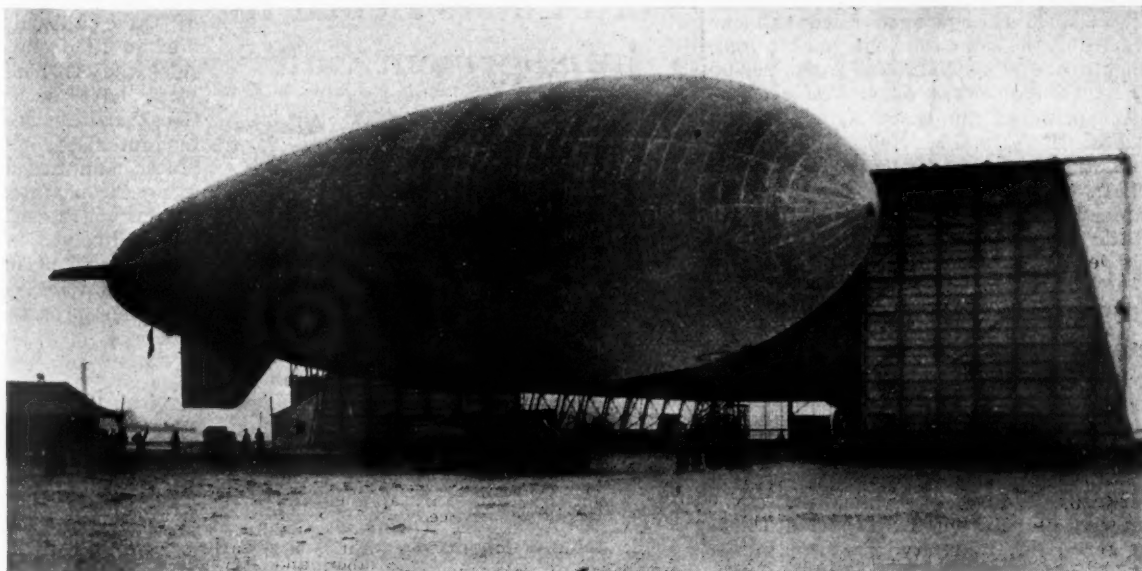
JOLIET, ILL., May 23—The Bates Machine & Tractor Co. is the successor to the two merged firms of the Bates Machine Co. and the Joliet Oil Tractor Co.

New Steam Carbureter on Market

DETROIT, May 24—The Security Sales Co. is marketing a steam carbureter operating on any gas or kerosene engine for cars, trucks and tractors. According to the company, the water taken from the motor drips into the valve, where it is converted into steam, then uniformly injected into all cylinders by operating the control from the dash or steering column. The extra hydrogen from the steam gives perfect combustion, it is said. The company is now getting into production on a fair scale.

C-1

The type of dirigible now used by the Navy



Fleet of Dirigibles for Navy Recommended by Navy Board

WASHINGTON, May 24—The construction of a fleet of dirigible aircraft for the Navy is expected to be recommended by the General Navy Board in its report to Secretary Daniels within a few days. As a result particularly of the NC seaplane flights, and also because of other general investigations and experiments, the board believes that a great part of the future aerial expansion will include dirigibles. The opinion prevails here that this aircraft can make the flight across the Atlantic with heavy loads and are safer because they can remain in the air indefinitely while any mechanical damage is being repaired.

Secretary Daniels says that in his opinion the Navy should make no effort toward any large aerial expansion during the next year or two but should experiment to improve existing types. He anticipates further flights similar to the transatlantic attempt as new airplanes and dirigible aircraft are developed. He pointed out that the transatlantic flight had already shown defects in the NC seaplanes which, he said, are now far in advance of the development along this line reached by any other country.

It is expected that the naval bill which was lost in the filibuster of the last Congress, and which contained an appropriation for \$10,000,000 toward the development of dirigible and other lighter-than-air machines, will be re-introduced in this special session.

Chicago-Cleveland Air Mail Successful

WASHINGTON, May 23—The air mail service established between Chicago and Cleveland on May 15 has had an unusual record for its first week of operation. In the 7 days 4160 miles were flown out of a possible 4480, and 28 trips accomplished out of 30, making a score of 93½ per cent.

There were no forced landings, but a 43-mile gale made the trips impossible

one day. A total of 87,200 letters were carried west from Cleveland and 74,600 east from Chicago. The average flying time from Cleveland to Chicago was 3 hr. 40 min., and from Chicago to Cleveland 3 hr. 20 min., the difference being due to prevailing head winds. The best time made was on one trip from Chicago to Cleveland when the 325 miles were traveled in 2 hr. 48 min., and the longest trip was 4 hr. from Cleveland to Chicago. The rebuilt De Havilland fours are being used, equipped with Liberty engines. These have a mail carrying capacity of 400 lb. each.

Dallas-Boston Flyers Continue Flight

WASHINGTON, May 23—The six De Havilland airplanes flying from Dallas to Boston are continuing their flight according to schedule. Following is the route traveled:

May	From	To	Miles	Min.
15	Dallas	Oklahoma	208	105
17	Oklahoma	Camp Funston	300	170
20	Camp Funston	Topeka	60	45
Total.....			568	320

Col. H. B. Claggett, commanding the flight, has received requests to make several stops en route to Boston and will give them favorable consideration if landing facilities are adequate. Capt. W. H. Chandler, the automobile racer, who tested the first Liberty motor; Lieutenants J. E. Duke, Jr., R. F. Midkiff and W. T. Campbell, well-known stunt fliers, are in this service. During the flight a record will be made of the condition of land passed over, photographs taken, and emergency and regular landing fields noted.

Wright Field Re-Leased

WASHINGTON, May 26—The Wilbur Wright aviation field at Dayton has been re-leased by the War Department and will be used as a permanent storage and training depot. The field comprises 1100 acres.

Allied Planes Double Number Controlled by the Enemy

WASHINGTON, May 23—The Allies had 5972 airplanes at the French-Belgian front on Nov. 11, 1918, when the armistice was signed, as compared with 2730, the total number controlled by the enemy. The balloon strength of the enemy, however, totaled 170, as against 144 of the Allies.

France had the greatest number of planes with an aggregate of 3321; the Germans, 2730; Great Britain, 1758, and the United States, 740. Italy controlled 812 planes over her front, against 622 under the Austrian forces. Following is the tabular comparison showing the number of planes at the fronts when the armistice was signed:

French-Belgian Front	Number of Planes
France	3321
Germany	2730
Great Britain.....	1758
United States.....	740
Belgium	153
Total Allied.....	5972
Total Enemy.....	2730

Italian Front	
Italy	812
Austria	622

Following is the comparison of balloon strength:

French-Belgian Front	Number of Balloons
Germany	170
France	72
Great Britain.....	43
United States.....	23
Belgium	6
Total Allied.....	144
Total Enemy.....	170

Italian Front	
Italy	32
Austria	26

Air Service Studies Meteorological Conditions

WASHINGTON, May 26—That the upper currents of air run parallel to isobars was discovered in recent studies of currents and meteorological conditions by the Army Air Service in Nebraska, Arkansas and Missouri, when balloon

ascensions were made for this purpose. Two 35,000 ft. hydrogen filled balloons started at the same time, one maintaining an altitude of 5000 ft., the other 10,000 ft. The balloon at 10,000 ft. rose at 10.30 p. m. at the U. S. Army Balloon School, Ft. Omaha, Neb., and landed at 1.30 p. m. the following day at Arcola, Miss. The lower altitude balloon remained in the air 16 hr. and landed at Little Rock, Ark.

71.3 Per Cent Casualties Among French Aviators

PARIS, May 10—During the first six months of 1918 casualties among French air pilots and observers attained 71.3 per cent. This included 16 per cent killed, 25.8 per cent wounded and 29.4 per cent missing. Of these latter 70 per cent were afterward reported killed. In aerial flights 116 pilots were killed, and 218 by accident. In comparison with this it may be stated that the infantry during the same period lost only 51 per cent. Gunners, bombers and mechanics are not included in the figures of losses.

Experimental Station for Tractors

WASHINGTON, May 24—The Mexican Government has granted a concession of 247 acres to a Mexican citizen at Mazatlan and as much more ground as may be necessary at Ose, State of Sinaloa, where an experimental farm will be established and American manufacturers can demonstrate their tractors at a nominal cost. The plan is to promote the sales of American tractors and farm implements and educate the people in modern farming methods. There are no Mexican import duties on tractors, and it is stated that any farmers taking advantage of the offer will be exempt from all local taxes. The soil offered for experiment is level and fertile, and during the dry season can be irrigated from the Quila River.

Huge Increase in Exports

WASHINGTON, May 23—April exports surpassed previous high records by nearly \$100,000,000, according to total figures announced to-day by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Exports for the month totaled \$715,000,000, as compared with \$623,000,000 for January, the previous high mark. For March of this year the total was \$605,000,000, and for April a year ago \$501,000,000. For the ten months ended with April the exports were valued at \$5,705,000,000, as against \$4,884,000,000 for the corresponding period last year.

Imports for April totaled \$273,000,000 in value, a gain of \$5,000,000 over the \$268,000,000 announced for March and a decrease of \$6,000,000 as compared with the \$279,000,000 for April of last year. Imports for the ten months ended with April are put at \$2,474,000,000, as compared with \$2,362,000,000 for a similar period in 1918.

Ford Enters Denial In Infringement Suit

Thomson Spot Welding Alleges Illegitimate Use of Patent Welding Device

DETROIT, May 23—The Ford Motor Co. has been charged by the Thomson Spot Welding Co. of Lynn, Mass., with infringement upon the patents held by the Massachusetts firm on an electric welding device which the plaintiff alleges is being used in the Ford plants without their permission or license. Damages, which may total millions, are being asked by the complaining company, which has just filed its declaration of action in the Federal Court of Equity here.

The plaintiff alleges that on Jan. 3, 1903, Johann Harmatta, an Austrian, invented an electric spot welder and filed his application for a letters patent on the same. One month prior to applying for a patent, the inventor, in writing, assigned his invention and patent right to the Thomson Electric Welding Co. In December, 1912, a letters patent, No. 1,046,055, was issued. The Thomson company then granted exclusive rights under the patent to the Universal Electric Welding Co., New York, and the two concerns assigned their joint rights to the plaintiff, the Thomson Spot Welding Co.

In March, 1913, the Thomson company started infringement proceedings against the Barney & Berry Co., but after two years of litigation lost their action when the Massachusetts district court ordered the bill of complaint dismissed. The case was appealed, however, and on Oct. 5, 1919, the Circuit Court of Appeals reversed the decision and returned the case to the district court for a new trial. Here the district court declared an infringement and granted an injunction prohibiting the Barney & Berry Co. from further use of the patents and awarded costs and damages.

In charging Ford with infringement upon the patents, the Thomson company asks for a perpetual injunction and a temporary injunction prohibiting the use of this welding device during the pendency of the suit. Damages, royalty for past use, and costs are also asked.

The Ford Motor Co., in its answer, which also has been filed, admits the existence of the patents in question, also ownership of these patents, but denies that it used and sold articles whose manufacture was covered by these patents, and adds that it never practised the patented process. The Ford company also declares that it was never duly notified of an infringement and denies that it was a party to the Barney & Berry litigation.

The company further states that upon investigation it finds that the patents are invalid and that they had the right to use them if they desired, because 19 American patents were filed on a similar process prior to the filing of the original

Thomson application in 1903. The first of these alleged priority patents was filed in 1886 and the last in 1909. Besides the American patents, similar devices have been patented in France, Great Britain and Germany. The defendant also declares that seven United States manufacturing concerns are daily using the same device and process, and asserts that the Thomson Spot Welding Co. is involved in a patent interference proceedings brought by Sebastian De Ferranti, who claims he holds patents on the same process, granted as early as 1900.

Mexican Employees for Ford Held Up

DETROIT, May 24—Henry Ford's delegation of Mexican workmen, which he was bringing here to take a course of instruction in tractor manufacture, has been held up at the border by order of the United States Immigration Department, and will not be permitted to enter the United States until Mr. Ford puts up a bond of \$500 for each man.

There are 50 Mexicans in the party, all of them recommended as especially adapted for manufacturing by the Mexican government. It is Mr. Ford's idea to make shop superintendents, department heads and foremen out of them and he has arranged for a school at his Dearborn plant. They will be employed in the Mexican tractor plant which Mr. Ford proposes to build soon. He refuses to pay the bond required and has appealed to Washington.

King Company Fighting for Purchase Option

DETROIT, May 23—The King Motor Co. has filed suit against the Wadsworth Real Estate Co., Morgan & Wright, the United States Rubber Co., Central Trust Co. of New York, and James N. Wallace, trustee of New York, to enforce an option the King company claims it holds on the site of its proposed new factory.

Under a 10-year lease given by the Hupp Motor Car Corp., the King company occupies a plant, the lease of which contains an option permitting purchase at any time during the life of the lease for \$27,500, plus the value of improvements. Buildings erected by the owners have been appraised at \$65,925. A year ago the King company formally notified the owners of its desire to exercise the purchase option on May 1, 1919. On that date, and on the day previous, formal tender of the sum stated was made to the owners of the property, but they declined to accept the cash or execute a deed. The King company is now asking the court to enforce the option.

Foreign Agencies for Duplex

LANSING, May 23—The Duplex Truck Co. has established agencies in Barcelona, Spain, and Copenhagen, Denmark. The company now has 65 direct distributors covering every part of the United States.

AUTOMOTIVE MATERIALS MARKETS

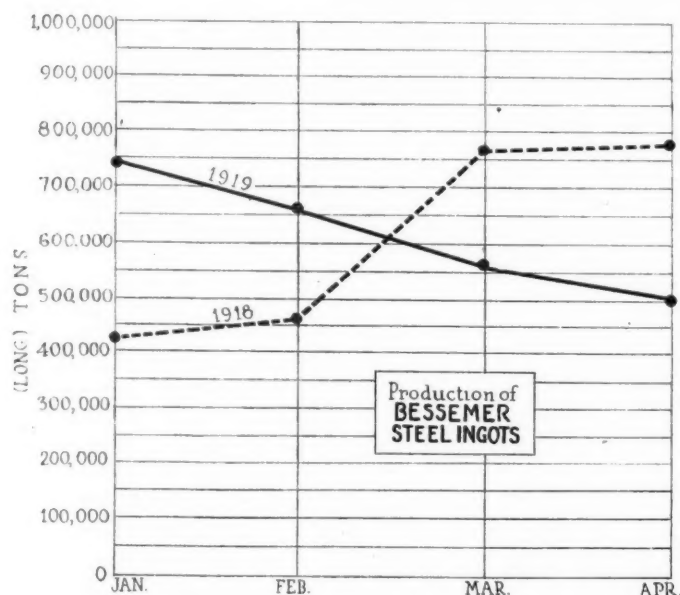
Materials Market Prices

Acids:			
Muriatic, lb.....	.02	-.03	
Phosphoric (85%), lb.....	.33	-.37	
Sulphuric (60%), lb.....	.08		
Aluminum:			
Ingot, lb.....	.33		
Sheets (18 gage or more), lb.....	.42		
Antimony, lb.....	.08	-.08 1/4	
Burlap:			
8 oz., yd.....	.10		
10 1/2 oz., yd.....	.11 1/2	-.11 3/4	
Copper:			
Elec., lb.....	.16 1/2	-.16 3/4	
Lake, lb.....	.17		
Fabric, Tire (17 1/4 oz.):			
Sea Is., combed, sq. yd.	1.40		
Egypt, combed, sq. yd.	1.25		
Egypt, carded, sq. yd.	1.20		
Peelers, combed, sq. yd.	1.08		
Peelers, carded, sq. yd.	.85		
Fibre (1/4 in. sheet base), lb.....	.50		
Graphite:			
Ceylon, lb.....	.09	-.22	
Madagascar, lb.....	.10	-.15	
Mexico, lb.....	.03 3/4		
Lead, lb.....	.05	-.05 1/4	
Leather:			
Hides, lb.....	.25	-.46	
Nickel, lb.....	.40		

Oil:

Petroleum (crude):		
Kansas, bbl.....	2.25	
Pennsy., bbl.....	4.00	
Gasoline:		
Auto, gal.....	.24 1/2	
68 to 70 gal.....	.30 1/2	
Lard:		
Prime City, gal.	2.70	
Ex. No. 1, gal.....	1.15	-1.20
Linseed, gal.....	1.56	-1.58
Menhaden (dark), gal.....	.75	-.80
Rubber:		
Plantation:		
First latex pale crepe, lb.....	.46	-.46 1/2
Brown crepe, thin, clear, lb.....	.40	-.41

Smoked, ribbed sheets, lb.....	.45 1/2	-.46
Para:		
Up River, fine, lb.	.56 1/4	
Up River, coarse, lb.....	.34 1/2	-.34 3/4
Island, fine, lb..	.47	-.47 1/2
Shellac (orange), lb.	.85	
Spelter, lb.....	.06 1/2	-.06 3/4
Steel:		
Angle beams and channels, lb.....	.06 1/2	-.03
Automobile sheet (see sp. table)		
Cold rolled, lb.....	.04 1/4	-.04 1/2
Hot rolled, lb.....	.03 1/2	-.03 3/4
Tin .....	.72 1/2	
Waste (cotton), lb..	.12 3/4	-.17



Monthly production of Bessemer steel ingots, although showing a substantial advance during January and February, 1919, fell off considerably during March and April. Output of open-hearth steel shows a similar drop

AUTOMOBILE SHEET PRICES

(Based on No. 22 Gage. Other gages at usual differentials)

	Primes only per 100 lbs.	Primes when seconds up to 15 per cent are taken per 100 lbs.
Automobile body stock.....	\$5.95	\$5.85
Automobile body stock, deep stamping	6.20	6.10
Automobile body stock, extra deep stamping	6.45	6.35
Hood, flat, fender, door and apron, or splash guard stock	6.05	5.95
Crown fender, cowl and radiator casing, extra deep stamping.....	6.55	6.45
Crown fender, cowl and radiator casing, deep stamping.....	6.30	6.20
Automobile Sheet Extras for Extreme Widths:		
Nos. 17 and 18 over 36 in. to 44 in., 10c. per 100 lbs.		
Nos. 19 and 21 over 36 in. to 44 in., 30c. per 100 lbs.		
Nos. 22 to 24 over 26 in. to 40 in., 40c. per 100 lbs.		
Nos. 22 to 24 over 40 in. to 44 in., 80c. per 100 lbs.		
Blank Sheet Extras to Apply to Narrow Widths:		
Oiling, 10c. per 100 lb.		
Patent leveling, 25c. per 100 lb.		

Resquaring, 5 per cent of gage price after quality, finish and size extras have been added.

Seconds 10 per cent less than the invoice Pittsburgh price for corresponding primes.

Automotive Securities on the Chicago Exchange at Close May 24

Net				Net				RUBBER STOCKS				Net			
Bid	Asked	Ch'ge		Bid	Asked	Ch'ge		Bid	Asked	Ch'ge		Bid	Asked	Ch'ge	
Auto Body Company.....	9	10	..	Motor Products Corp.....	45	50	..	Ajax Rubber Co.....	85 1/2	87 1/2	+2 1/2	Firestone T. & R. com....	156	159	..
Briscoe Motor Car com...	14	..	..	Nash Motors Co. com....	230	..	..	Firestone T. & R. pfd....	100	101	..	Fisk Rubber Co. com....	133	134	..
Briscoe Motor Car pfd....	50	65	..	Nash Motors Co. pfd....	96	100	..	Fisk Rubber 1st pfd.....	105	115	+5	Fisk Rubber 2d pfd.....	135	142	..
*Chandler Motor Car.....	181	183	+25 3/4	National Motor Co.....	16	20	..	Fisk Rubber 1st pfd. conv.	105	110	..	*Goodrich, B. F. com....	71	72	+1 1/2
Chevrolet Motor Car.....	209	211	..	Packard Motor Car com...	192	196	+2	Goodrich, B. F. pfd.....	106 7/8	108 7/8	..	Goodyear T. & R. com....	300	305	-30
Cole Motor Car Co.....	120	125	..	Packard Motor Car pfd...	100	102	..	Goodyear T. & R. 1st pfd.	106	107 1/2	..	*Goodyear T. & R. 2d pfd.	107	109	..
Continental Motors com...	8 3/4	9 1/8	+ 1/8	Paige-Detroit Motor com.	37	38 1/4	-1	*Kelly-Springfield com...	120	121	-2 1/4	Kelly-Springfield pfd....	95	97	..
Continental Motors pfd...	96	99	..	Paige-Detroit Motor pfd.	9	9 3/4	..	Lee Tire & Rubber Co....	32	33	..	Marathon Tire & Rubber...	55	..	..
Edmunds & Jones com....	27	30	-1	Peerless Motor Truck....	36	38	+2	Miller Rubber Co. com....	195	201	-5	Miller Rubber Co. pfd....	104	106	-1
Edmunds & Jones pfd....	78	82	+3	*Pierce-Arrow M. Car com.	51 3/8	52 3/8	+ 7/8	Rubber Products Co.....	145	155	-10	Portage Rubber Co. com...	155	165	-16
Electric Storage Bat.....	76	78	..	Pierce-Arrow M. Car pfd.	102	104	..	Swinehart T. & R. Co....	90	95	+2	U. S. Rubber Co. com....	97 1/2	98 1/2	- 1/2
Federal Motor Truck.....	42	44	..	Premier Motor Corp. com.	5	..	..	*U. S. Rubber Co. pfd....	113 1/2	114 1/2	+ 1/4				
Fisher Body Co. com....	77	79	+3 3/8	Premier Motor Corp. pfd.	..	75	..								
Fisher Body Co. pfd....	98	101	..	Prudden Wheel Company..	21	22	..								
Ford Motor of Canada....	320	330	..	Reo Motor Car Co.....	29	30	..								
General Motors com....	188 3/4	189 3/4	+3 3/4	Republic M. Truck com...	49	50 1/2	+3								
General Motors pfd....	89 3/4	91 1/4	..	Republic M. Truck pfd...	90	94	-1								
Hupp Motor Car com....	9	9 1/2	+ 1/4	Saxon Motor Car com....	8 1/2	10 1/2	+ 1 1/2								
Hupp Motor Car pfd....	98	101	..	Scripps-Booth Corp.....	25	30	..								
Kelsey Wheel Co. com....	35	37	..	Stewart-Warner S. Corp..	91	93	+1								
Kelsey Wheel Co. pfd....	93	95	..	Stromberg Carburetor Co.	38	40	..								
Manhattan Electric S. com.	..	48	..	Studebaker Corp. com...	84 3/8	85 3/8	+2 3/8								
Maxwell Motor com....	44	45	-1 3/4	Studebaker Corp. pfd....	54	97	..								
Maxwell Motor 1st pfd....	72 1/2	73 1/2	+1 1/4	Stutz Motor Car Co.....	60	61	+2 1/2								
Maxwell Motor 2d pfd....	35 1/2	36 1/2	+2 1/4	United Motors Corp.....	47	49	..								
McCord Mfg. com.....	39 1/2	41 1/2	- 1/2	White Motor Co.....	57	58	- 3/4								
McCord Mfg. pfd.....	102	104	..	Willys-Overland com....	35	36	+ 7/8								
Mitchell Motor Co.....	43	45	-2	Willys-Overland pfd....	92	93	..								

*Ex dividend.

Calendar

SHOWS

- May 15-June 1—Venezuela. National Exhibit of Venezuela.
- *Oct. 15—Paris. Grand Palais. International Automobile Mfrs. Congress.
- No. 7-16—London. Olympia Motor Car Exhibition—Society of Motor Mfrs. and Trades.
- December—Brussels. International Automobile Mfrs. Congress.
- January—New York. International Automobile Mfrs. Congress.
- February—Chicago. International Automobile Mfrs. Congress.
- Feb. 23-Mar. 6—Birmingham. Eng. British Industries Fair.

TRACTOR SHOWS

- May 30—College Park, Md.—Power cultivator Demonstration, Maryland State Dept. of Agriculture.
- June 9-12—Denver, Colo. Sectional Tractor Demonstrations. Denver Tractor Club.
- July 14—Wichita, Kan. Automotive Committee of National Implement Assn.

July 28-29—Columbus, O. Tractor show in charge of Prof. H. C. Ramower, head of agricultural engineering department of Ohio State University.

Aug. 1-2—Piqua, O. Tractor show in charge of Prof. H. C. Ramower, head of agricultural engineering department of Ohio State University.

Aug. 6-7—Fostoria, O. Tractor show in charge of Prof. H. C. Ramower, head of agricultural engineering department of Ohio State University.

Aug. 12-13—Akron, O. Tractor show in charge of Prof. H. C. Ramower, head of agricultural engineering department of Ohio State University.

Aug. 18-22—Aberdeen, S. D. Sectional Tractor Demonstrations.

October—Ottawa, Ont., Can. Interprovincial Plowing Match and Tractor Demonstration.

CONTESTS

May 30—Atlantic City, N. J.—Airplane races—Aeronautic Convention.

May 30-31—Richmond, Va. 2-Day Dirt Track Meet, Virginia State Fair Grounds Track.

†May 30-31—Los Angeles, Cal.—Los Angeles-Yosemite 3rd annual gasoline economy run.

†May 31—Indianapolis. Indianapolis Motor Speedway Assn., 500 miles.

*June 14—Sheepshead Bay, L. I. Speedway race.

July 4—Atlantic City, N. J.—Airplane races—Aeronautic Convention.

*July 5—Cincinnati, O. Speedway.

*July 19—Uniontown, Pa. Speedway race.

*July 26—Sheepshead Bay, L. I. Speedway race.

*Aug. 15—Middletown, N. Y. Dirt track event.

*Aug. 22-23—Elgin, Ill. Road race.

*Aug. 23—Sheepshead Bay, L. I. Speedway race.

*Sept. 1—Uniontown, Pa. Speedway race.

*Sept. 20—Sheepshead Bay, L. I. Speedway race.

*Sept. 27—Allentown, Pa. Dirt track event.

*Oct. 1—Cincinnati, O. Speedway race.

*Oct. 4—Trenton, N. J. Dirt track event.

*Oct. 11—Danbury, Conn. Dirt track event.

*Tentative dates.
†Sanctioned.

CONVENTIONS

May 1-June 1—Atlantic City, N. J. Pan-American Aeronautic Convention and Exhibition—Aero Club of America, the Aerial League of America and the Pan-American Aeronautic Federation.

June 2-3—Chicago, Ill. Natl. Gas Engine Assn. Hotel Sherman.

June 2-6—Hot Springs, Va. Convention Automotive Equipment Assn., Homestead Hotel.

June 3-6—Washington. Pan-American Commercial Conference, Pan-American Building.

June 12-14—Pittsburgh. Annual convention of American Drop Forge Assn. and Drop Forge Supply Assn., William Penn Hotel.

June 23-28—Ottawa Beach, Mich. S. A. E. Mid-summer Meeting.

Sept. 22-24—Philadelphia. Annual Convention, National Association of Purchasing Agents, Bellevue-Stratford.

May 12-15, 1920—San Francisco. Seventh National Foreign Trade Convention.

Foreign Trade Opportunities

WASHINGTON, May 24—The Bureau of Foreign and Domestic Commerce, Department of Commerce, has received requests for automobiles or parts, airplanes, trucks and tractors and accessories agencies from individuals and companies in foreign countries. These are listed below. For further information address the Bureau of Foreign and Domestic Commerce and specify the foreign trade opportunity number.

Belgium—Medium priced cars and accessories. No. 29337.

Denmark—Medium priced cars, accessories and tractors in the Scandinavian and Balkan countries. No. 29342.

Spain—Cars, motorcycles and bicycles. Correspondence should be in Spanish. No. 29346.

American firm to represent manufacturers throughout Holland, Belgium and France in the sale of cars and accessories, etc. No. 29352.

American firm—representative to South America via Cuba—cars and accessories. No. 29365.

Mexico—Tractors for Northern Mexico. Correspondence may be in English. No. 29390.

Spain—Cars, bicycles, motorcycles and automobile accessories. No. 29400.

A National Trademark

WASHINGTON, May 24—A bill introduced in the House yesterday by Congressman Sims provides for a trademark to be selected by the Secretary of Commerce and which will be known as "The National Trademark." It is to be registered in the Patent Office in the name of the United States of America, without limitation of time and covering all classes of goods which are recognized under trademark laws.

The Secretary of Commerce is authorized to issue licenses for the use

of the trademark under certain rules and regulations to any American manufacturer or producer. He is also given the right to institute and maintain proceedings when the rights of the trademark have been infringed upon.

The bill provides for the sum of \$25,000 to be used in the expense of carrying the provisions of the act into effect, and has penalties for using any trademark similar enough to deceive purchasers into believing it to be the national trademark.

Change in British Import Restrictions

WASHINGTON, May 24—All restrictions have been removed on a number of commodities to Great Britain which may be shipped without individual licenses and which include: lubricators, injectors and ejectors, expansion joints, iron or brass pressed steel union couplings, copper, steel and iron wire rods, waste or scrap rubber.

Restrictions on the importation of motor car jacks have also been removed by Great Britain.

Farm tractors and tractor plows will be allowed only under special licenses and only in exceptional cases.

Lotex to Make Casings and Tubes

FOND DU LAC, WIS., May 24—The Lotex Tire Co. has been organized with an authorized capital of \$100,000 to manufacture pneumatic casings and tubes. Work will begin in about a week on the erection of the first unit of its plant here to cost \$35,000. The factory will employ 60 to 75 operatives at the start.

Government Places Orders for Parts

WASHINGTON, May 24—The Motors and Vehicles Division, War Department, has placed orders as follows:

B. F. Goodrich Rubber Co., Akron, 500 35x4½ fabric Q. D. clinchers, non-skid casings, and packing, \$11,672.50.

Continental Motors Corp., Muskegon, Mich., miscellaneous spare parts for maintenance of 738 light aviation trucks, including boxing, \$17,686.25.

Kelly-Springfield Motor Truck Co., Springfield, O., spare parts for 280 trucks, \$14,223.26.

The Nash Motors Co., Kenosha, Wis., spare parts for trucks, \$442,354.74.

Garford Motor Truck Co., Lima, O., four sets spare parts for repair and maintenance of 1½-ton trucks, \$740,604.16.

International Motor Co., New York City, spare parts for maintenance of Mack 5½-ton trucks, \$1,482,080.76.

Macomber & Whyte Open Branches

KENOSHA, WIS., May 23—The Macomber & Whyte Rope Co. has opened a branch at Birmingham, Ala., under the management of James A. Boope, southern manager, at 805 American Trust Bank Building. A New York City branch, with E. E. Robirds in charge, has been opened at 30 Church Street.

New York to Spend \$16,000,000 on Roads

ALBANY, N. Y., May 23—The expenditure of over \$16,000,000 is contemplated by New York state this year. The state is to receive from the Automobile Bureau in 1920 over \$8,000,000 to be spent for maintenance and repair of highways as against \$2,700,000 from the same source in 1918. In addition the various towns and counties will spend over \$5,000,000 for the same purpose.